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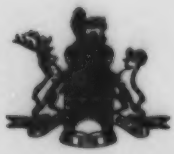
HANDBOOK No. 32

The Pea Family
(Leguminosæ)
of British Columbia

By T. M. C. Taylor
Illustrations by R. A. With



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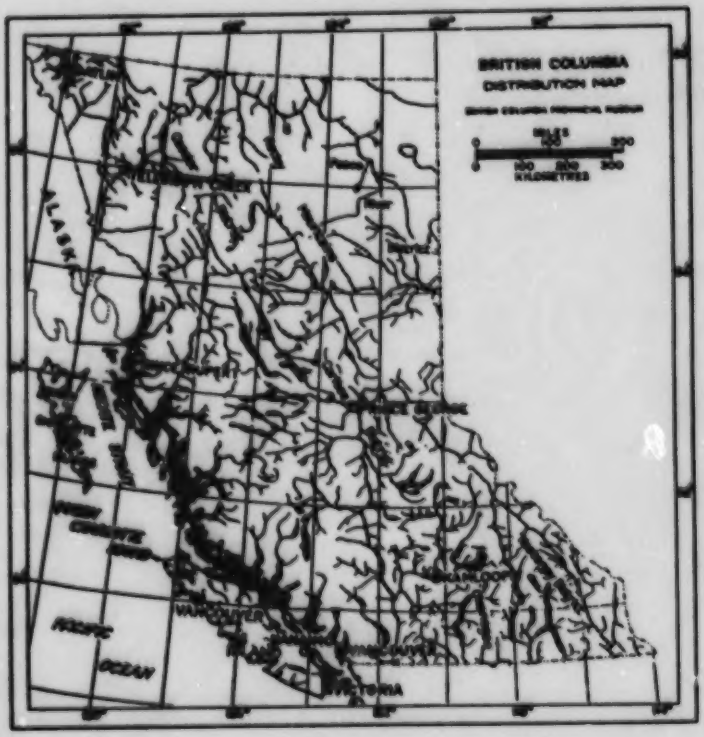
BRITISH COLUMBIA
DISTRIBUTION MAP
ALASKA
PACIFIC
OCEAN
VICTORIA

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THE PEA FAMILY (Leguminosæ) OF BRITISH COLUMBIA

INTRODUCTION

In point of number of species the Pea Family is one of the largest among the flowering plants. It attains its greatest development in diversity and numbers in tropical regions where members range in size from immense trees to lowly herbs. The great majority of tropical and subtropical representatives are trees and shrubs. These life-forms, however, gradually disappear as one goes northward, until in our area all species are herbs.

As would be expected in such a large family, not only is there great variability in form but also a great range of ecological adaptation—from desert to rain forest, from tropical heat to arctic tundra, and from sea-level to high alpine regions. Species of this family are found on all continents and in all latitudes, both north and south of the Equator.

To early man in the New World, particularly in the southwestern United States and in the Andean regions of South America, beans were a staple in his diet. Practically all our cultivated beans, and probably peanuts as well, had their origin in these areas; from southwest Asia came the soy bean and from the Mediterranean region the broad bean. Peas in variety also came from the Mediterranean as did lentils. Other members of the family are important as live-stock fodder, as for example, clover, alfalfa, and vetch.

Forest species contribute valuable wood for lumber, also some dyes such as hæmatoxylon; a number of herbaceous species, including indigo, are also dye sources, others produce rotenone, an important insecticide and fish poison, some species of *Astragalus* and *Oxytropis* (loco weeds) are poisonous to live stock, and so it goes. One must not forget the contribution various leguminous plants make to our gardens, sweet peas, lupines, and brooms, only to mention a few, and the final accolade—the national flower of Australia is the wattle, a species of *Acacia*.

On technical, morphological grounds this large assemblage of species is usually divided into three subfamilies, by some botantists these are raised to the rank of full families. Of these, all our genera are in the same subfamily, with a remarkable uniformity in flower structure. The parts of the flower are in 5's except that there is a single carpel. The arrangement of the petals and stamens is peculiar. Most people can call to mind the appearance of a pea flower, to refresh your memory look at the accompanying plate. The two lower petals are fused along their adjacent margins to form the *keel;* the two lateral petals, which often stand out at a wide angle to the keel, are the *wings,* while the top petal, and usually the largest, is the *standard* (or banner). There are 10 stamens, in most of our genera the filaments of 9 of these are united into a tube leaving the tenth and upper stamen free. The fruit developed from the single carpel is a *legume* (or pod). In most cases the pod, which is often somewhat flattened, opens by splitting *(dehiscing)* along the two edges. In some genera this opening is quite explosive, so that the seeds are thrown for some distance from the mother plant. On a hot summer's day one can hear the broom pods opening with a crackling sound and may even see the seeds being thrown out.

The following account of the Pea Family in British Columbia is for the most part based on specimens in the collections of the University of British Columbia and the Provincial Museum. These specimens also provide the data for the distribution map that accompanies the description of each species. In addition, each species is illustrated with special attention given to the diagnostic characters. For ease of reference the genera and their species are arranged alphabetically throughout. A glossary is provided for those less familiar with the technical terms used in the descriptions. Finally, a short list of reference books is included for the interest of those who may wish more general accounts of certain genera.

Chief among these references is the five-volume work *Vascular Plants of the Pacific Northwest,* edited, and largely written, by Prof. C. L. Hitchcock, of the Department of Botany, University of Washington, Seattle. Dr. Hitchcock is one of the leading systematic botanists in North America and the greatest authority on

the flora of the Pacific Northwest. Botanists, and plant lovers generally, owe Dr. Hitchcock a debt of gratitude for the production of this scholarly work in which not only is each species illustrated but after the name of each is given its nomenclatural history. There are also discussions of the variability of species over their range and other data of general interest. A more recent work from the same source is the single volume *Flora of the Pacific Northwest*. This is essentially a well-illustrated key and as such is unique and most helpful.

This handbook, like its predecessors, is in no way monographic and no revisions or new names are to be found in it. Rather, it is an attempt to provide an up-to-date account of the Leguminosæ of British Columbia based on the researches of various specialists whose names appear after the generic descriptions. To all of these grateful acknowledgment is made.

Monographers nearly always find it useful to subdivide species into smaller units such as subspecies and varieties. These categories are based on minor morphological differences usually related to differences in range and sometimes ecology. It is felt that the value of this handbook would not be greatly increased by including such additional information and so these details are omitted. Those concerned should consult one of the reference books listed on page 246.

Botanists are frequently criticized for name-changing. The critics are usually exasperated amateurs somewhat limited in their knowledge of the principles that underlie the whole system of plant-naming. This, however, is not an appropriate place to discuss such an important matter, suffice it to say that each species can only bear a single valid name and this in general is the one with priority in time over other names that may have been given to it. As compared to some generations ago, contemporary changes are comparatively few. They are the result, in large measure, of modern research and the light this sheds on the application of the principle of priority. Invalid names that have been given in the past are referred to as synonyms. Where it is felt to be useful these have been added at the end of the specific descriptions.

Some mention should also be made of common or vernacular names. These unfortunately are often given with little reason and no consistency. As no rules are followed, the result is frequently very confusing; a fancied resemblance is commonly sufficient to give the same name to two or more quite unrelated species. One finds, for example, the name "clover" applied to several species in different genera in the Pea Family as well as to a member of the Figwort Family. Nevertheless, a number of people interested in flowers find it easier to remember a common rather than a scientific name. For these a single common name has been supplied for each species.

The use of common names varies from region to region, so that the selection of one for each species must of necessity be somewhat arbitrary. Furthermore, in many large genera, species are not distinguished by common names. A further debt that we owe Dr. Hitchcock is the fact that in his *Flora* he has supplied common names for each of the species he includes. Some of the common names used here have been derived from other sources, but in general the writer is grateful for being able to draw on Dr. Hitchcock's selection.

Such value as this handbook may have is greatly enhanced by the excellent illustrations made with great care and skill by Ronald With. The unfailing support and co-operation of Dr. Adam F. Szczawinski, Curator of Botany in the Museum, is gratefully acknowledged.

LEGUMINOSÆ Pea Family

Trees, shrubs, and herbs. Leaves simple, simply pinnately or palmately compound, alternate, usually stipulate. Inflorescence various, mostly in pedunculate racemes, spikes, or heads, sometimes the flowers solitary. Flowers perfect. Calyx of 5, at least partially, connate sepals. Corolla papilionaceous (in ours) of 5 petals; the upper (the standard) usually larger than the others and enclosing them in the bud, often reflexed and spreading in anthesis; the two

lateral petals (the wings) exterior to the lower two (the keel), which are more or less coherent along their dorsal margin; the keel usually encloses the stamens and the carpel. Stamens 10, uncommonly 5, monadelphous or diadelphous with 9 united into a tube and 1 (the upper) separate. Carpels 1. Fruit usually dehiscent along two sutures (legume or pod), sometimes indehiscent, rarely breaking transversely into 1-seeded segments (loment); seeds 1–several.

The third-largest family of flowering plants with about 600 genera and perhaps 12,000 species, found in all parts of the world.

KEY TO THE GENERA

1. Stamens all free; stipules conspicuous; flowers yellow, racemose .... *Thermopsis*

1. Some (9) or all stamens united.
   2. Shrubs; flowers solitary in leaf axils.
      Leaves spinous or reduced to scales ..... *Ulex*
      Leaves not spinous, usually 1- to 3-foliate ..... *Cytisus*
   2. Herbs, but sometimes somewhat woody at base.
      3. Leaves even-pinnate, or terminal leaflets represented by a tendril.
         Style filiform, bearded around the apex; tendrils present or absent ..... *Vicia*
         Style flattened, bearded along the upper side; tendrils present ..... *Lathyrus*
      3. Leaves odd-pinnate, palmate, or trifoliate.
         4. Leaflets on ordinary well-developed leaves more than 3.
            5. Flowers solitary or umbellate ..... *Lotus*
            5. Flowers in terminal or axillary racemes or spikes.
               6. Leaves palmately compound ..... *Lupinus*
               6. Leaves pinnately compound .....
                  7. Leaves glandular punctate ..... *Glycyrrhiza*
                  7. Leaves not glandular.
                     8. Pods transversely constricted into a few segments ..... *Hedysarum*
                     8. Pods not transversely constricted.
                        9. Pods short, flat, spiny on margins ..... *Onobrychis*
                        9. Pods ovoid to subglobose or linear, not spiny.
                           Keel abruptly prolonged into a short beak; plants usually without leafy stems *Oxytropis*
                           Keel not abruptly beaked, rounded or acute; plants mostly with leafy stems .... *Astragalus*

4. Leaflets 3.
   10. Leaflets serrulate.
      11. Flowers in slender, elongated racemes.....*Melilotus*
      11. Flowers in short or head-like racemes.
         Flowers persistent, marcescent; pods straight.....*Trifolium*
         Flowers deciduous; pods coiled or curved.....*Medicago*
   10. Leaflets entire, not serrulate.
      Flowers axillary, solitary, or umbellate.....*Lotus*
      Flowers in dense terminal racemes.....*Psoralea*

ASTRAGALUS L. Locoweed, Milk-vetch

Perennial herbs (ours) with stout taproot, caudex, or rhizome. Pubescence various, usually with appressed hairs, basically of two types, either basally attached (basifixed), or attached laterally or subterminally (dolabriform). Leaves pinnately compound; leaflets usually jointed to the rachis; stipules free or connate. Flowers in pedunculate, axillary racemes; white through pinkish-purple. Calyx-tube campanulate to cylindric, lobes short for the most part, triangular or subulate. Banner more or less oblong-ovate, recurved, usually longer than the wings, and the wings mostly longer than the keel. Stamens 10, diadelphous. Legumes (pods) sessile to conspicuously stipitate, short or long, turgid or laterally compressed, in some species one or both sutures may intrude to form a false, longitudinal partition, so pods are uniloculate, or falsely or truly biloculate; seeds few.

Large genus of over 2,000 species, chiefly of North Temperate and Arctic regions, numerous species are found in arid or semi-arid areas; a number of species are poisonous to live stock, hence the common name *locoweed*.

Key for flowering material adapted from Barneby in Hitchcock *et al., Vascular Plants of the Pacific Northwest*, Part 3. 1961:

1. Pubescence of herbage dolabriform.
   2. Stipules, at least those at the lower nodes (and sometimes all), connate opposite the petiole.
      3. Standard more than 13 mm long; keel obtuse, more than 9 mm long; pod 2-celled.

4. Flowers declined and retrorsely imbricated; stems arising singly or few together from oblique or creeping rhizomes ..... *A. canadensis*

4. Flowers erect or ascending at a narrow angle; stems arising together from a superficial root-crown or shortly forking caudex ..... *A. striatus*

3. Standard less than 13 cm long; keel less than 9 mm long, triangular, acutish at tip; pod 1-celled ..... *A. miser*

2. Stipules variably decurrent or amplexicaul but not connate opposite the petiole ..... *A. lotiflorus*

1. Pubescence basifixed.

5. Stipules at the lowest node (sometimes at all) fully amplexicaul and connate opposite the petiole, or (if the lowest nodes are bladeless) the stipules united around the stem as a low collar or sheath.

6. Standard (measured along the curvature of the midvein) over 15 mm long.

Flowers erect, crowded into ovoid heads; stems arising from a buried root-crown; pod hirsute ..... *A. dasyglottis*

Flowers in loose racemes, spreading to pendent; stems arising from a superficial root-crown; pods glabrous or strigose ..... *A. filipes*

6. Standard less than 10 mm long.

7. Keel petals 2.5–6 mm long.

8. Immature pods nearly always bearing some dark hairs ..... *A. eucosmus*

8. Immature pod strigillose with white hairs or glabrous.

9. Pod inflated, obovoid or subglobose, sessile ..... *A. microcystis*

9. Pod laterally compressed and oblong or lentiform in profile, not inflated, sometimes stipitate.

Stems mostly erect; flowers white; pod stipitate; stipules blackening on drying ..... *A. tenellus*

Stems diffuse or prostrate, often matted, if erect petals purplish; pod sessile; stipules not blackening ..... *A. vexilliflexus*

7. Keel petals over 6 mm long.

10. Wings deeply bidenate at apex ..... *A. aboriginum*

10. Wings entire or obscurely truncate-emarginate.

11. Stems arising singly or few together from slender, widely creeping, subterranean caudex branches; plants of deep, cool soil in the mountains ..... *A. alpinus*

11. Stems arising together from the caudex, if the caudex subterranean, then plants of dry foothills and prairies or alpine screes and ridges.

12. Ovary and pod pubescent with (at least some) black hairs.
    Leaflets 11–19, mostly elliptic and acute; pod laterally compressed, sutures both prominent; ovules 2–6 ..... *A. bourgovii*
    Leaflets 9–13, oval or oblong, obtuse; pod flattened dorsally, obtusely triquetrous; ovules 7–9 ..... *A. robbinsii*
12. Ovary and pod glabrous or white strigillose.
    13. Keel tip bluntly rounded at apex; pod linear-oblanceolate, terete, or slightly dorsi-ventrally compressed; plains species ..... *A. flexuosus*
    13. Keel tip triangular, acute or acutish; pods laterally compressed; mostly montane.
        Stems erect, 3–9 dm tall; pods stipitate ..... *A. filipes*
        Stems often prostrate, 1–5 dm long; pods nearly or quite sessile ..... *A. miser*

5. Stipules petiolar or petiole-cauline, variably decurrent-amplexicaul but not united opposite the petiole.
14. Standard over 15 mm long.
    15. Ovary and pod glabrous.
        16. Ovary and pod stipitate (in *A. beckwithii* elevated on on a stipe-like gynophore).
            Calyx glabrous except for a few hairs on the teeth, 4–7 mm long ..... *A. beckwithii*
            Calyx pubescent on the tube (even though thinly so); if glabrescent, the teeth much less than 3.5 mm long ..... *A. collinus*
        16. Ovary and pod sessile.
            Pods subglobose, merely cuspidate at the apex, not beaked, the valves thickly fleshly, at least 2 mm thick in section ..... *A. crassicarpus*
            Pods subglobose to lance-ellipsoid, but always terminating in a well-defined, laterally flattened, usually incurved beak; pods leathery or thinly fleshly, valves much less than 1 mm thick in section ..... *A. lentiginosus*
    15. Ovary and pod pubescent.
        17. Calyx gibbous-saccate dorsally behind the pedicel ..... *A. collinus*
        17. Calyx not gibbous though often oblique at base.
            18. Racemes not over 10-flowered.
                Stipules at the lower leafless nodes united into an entire, obtuse blade; plant stoloniferous;

pod stipitate; leaflets green and glabrous above, thinly villous below ..... *A. umbellatus*

Stipules not connate, ovate to oblong-lanceolate; plant not stoloniferous; pod sessile; leaflets uniformly and densely silvery-strigose or soft villous-tomentose on both sides ..... *A. purshii*

18. Racemes generally over 10-flowered, or if rarely less than 10-flowered then the herbage green and the leaflets glabrous or medially glabrescent above.

Pod long-stipitate, laterally compressed ..... *A. sclerocarpus*

Pod sessile, inflated ..... *A. lentiginosus*

14. Standard not over 15 mm long.

19. Standard 10–15 mm long.

20. Cauline stipules very large, foliaceous, deflexed.

Stem less than 2 dm tall; calyx-tube somewhat villous; pod densely dark pubescent ..... *A. umbellatus*

Stem more than 3 dm tall; calyx-tube glabrous; pod glabrous or minutely strigillose ..... *A. americanus*

20. Cauline stipules not foliaceous.

21. Standard (usually because of its erectness) shorter than the wings (sometimes only slightly so) ..... *A. collinus*

21. Standard, as measured along the curved dorsal axis, longer than the wings (sometimes only slightly so).

Ovary and pod quite sessile ..... *A. lentiginosus*

Ovary and pod long stipitate ..... *A. sclerocarpus*

19. Standard less than 10 mm long.

22. Leaflets 5–7, densely pannose-tomentose; pod thickly hirsute-tomentose, 1-celled ..... *A. purshii*

22. Leaflets more than 7; if the plant tomentose then ovary nearly or quite 2-celled.

Petals lilac or purplish, often drying bluish ..... *A. eucosmus*

Petals yellowish-white or buff, often drying yellowish, only tip of keel lilac ..... *A. lentiginosus*

Key for fruiting material adapted from Barneby, 1961:

1. Inflorescence, even in fruit, a head-like spike nearly as broad as long calyx often black-hairy; corolla purplish, about 15 mm long; pod erect, about 1 cm long, ovoid, greyish- or blackish-pilose, cordate in cross-section due to the complete intrusion of the lower suture; plant rhizomatomous ..... *A. dasyglottis*

1. Inflorescence seldom capitate or as broad as long, but if so, plants not otherwise like *A. dasyglottis*.
   2. Pod woolly or villous with long white or greyish hairs that almost or quite conceal the surface, usually woody or leathery in texture with the lower suture intruded to divide the cavity more or less completely into 2 cells ..... *A. purshii*
   2. Pod neither woolly nor with the surface concealed by the often dense but short, or less abundant, longer pubescence, the texture of the pod various, the lower suture often not intruded.
      3. Pod fleshy, nearly globose, 2–3 cm long, 2-celled, glabrous; calyx with 2, sometimes 3, membranous scales at the base..... *A. crassicarpus*
      3. Pods usually not fleshy, or if fleshy then not otherwise as above; calyx usually without scales at the base.
         4. Plants essentially acaulescent, silvery, pubescence dense, usually tightly appressed, dolabriform ..... *A. lotiflorus*
         4. Plant usually caulescent, or if subcaulescent then pubescence basifixed.
            5. Pod inflated, thin and papery and not at all woody, ovoid, globose, or obovoid, usually neither conspicuously compressed or obcompressed.
               6. Pod stipitate, narrowed to a stalk-like base at least as long as the calyx.
                  7. Leaflets more than 2 cm long; stipules leaf-like.
                     Stems mostly less than 2 dm tall; racemes less than 11-flowered; pedicels densely villous, lobes 1–2 mm long; banner 14–17 mm long; pod densely black or fuscous-pubescent..... *A. umbellatus*
                     Stems mostly more than 3 dm tall; racemes more than 11-flowered; pedicels sparsely villous; calyx glabrous, lobes less than 1 mm long; banner 10–14 mm long; pod glabrous or minutely strigulose ..... *A. americanus*
                  7. Leaflets usually less than 2 cm long; stipules linear to oblanceolate ..... *A. collinus*
               6. Pod not visibly stipitate, the stalk, if any, concealed by the calyx.
                  Pod about 1 cm long, broadest at or above the middle, hairy, not particularly oblique; stipules connate; calyx-teeth linear, subequal to the tube. ..... *A. microcystis*
                  Pod usually well over 1 cm long, if only that long then usually very oblique; stipules often free; calyx-teeth much shorter than the tube.

8. Pod nearly, or quite, 2-celled ..... *A. lentiginosus*
8. Pod strictly 1-celled, the sutures only slightly, or not at all, intruded.
Flowers more than 14 mm long; calyx-tube more than 4 mm long ..... *A. collinus*
Flowers less than 14 mm long; calyx-tube usually less than 4 mm long ..... *A. microcystis*

5. Pod not inflated, or if inflated then tough, often woody, usually elliptic to linear or oblong in outline, often strongly compressed or obcompressed.
9. Pod not visibly stipitate, the stalk, if any, shorter than the calyx and concealed by it.
10. Pod 1-celled with lower suture very slightly (if at all) intruded, either round in section, or more commonly compressed.
11. Calyx and pod very conspicuously pubescent with appressed black, or at least dark, hairs; plant not at all rhizomatous.
Racemes at least 20-flowered as a rule; stipules free, or the lowest slightly connate; pod usually about 15 mm long ..... *A. robbinsii*
Racemes mostly 5- to 10-flowered; stipules strongly connate; pod usually about 15 mm long ..... *A. bourgovii*
11. Calyx and pod not both black hairy, or the plant strongly rhizomatous.
12. Pod less than 10 mm long, elliptic-oblong, acute; leaflets 1–4 mm broad, greyish hairy; flowers 5–8 mm long ..... *A. vexilliflexus*
12. Pod over 10 mm long and (usually) linear or oblong, or leaflets either over 4 mm broad or not greyish hairy, or flowers over 10 mm long.
13. Pod terete or slightly compressed, 12–21 mm long, 2–3 mm thick, partially filled between the seeds with criss-crossing fibrous strands ..... *A. flexuosus*
13. Pod usually compressed, if terete then over 3 mm thick or not filled with fibrous material.
14. Pod obliquely elliptic in outline, 8–12 mm long ..... *A. eucosmus*

14. Pod linear or narrowly oblong in outline, usually well over 12 mm long.
    Stipules connate opposite the petiole; corolla less than 12 mm long; calyx-tube usually less than 3 mm long ..... *A. mixer*
    Stipules not connate opposite the petiole; corolla mostly over 12 mm long; calyx-tube more than 4 mm long ..... *A. collinus*

10. Pod either partially to completely 2-celled (the lower suture at least somewhat intruded) or more or less cordate, reniform or obcompressed in section.
    15. Pod inflated to turgid, ovoid to ovoid-lanceolate, terete or more or less didymous in section, tapered to a distinct and prominent beak that is laterally compressed to filiform, and 1-celled; plant usually greenish ..... *A. lentiginosus*
    15. Pod not as above, usually more nearly linear to oblong in outline, seldom beaked as above; plant often greyish hairy.
        Plant strongly rhizomatous; pod 8–20 mm long, 4–5 mm broad ..... *A. canadensis*
        Plant nonrhizomatous; pod 8–12 mm long, 3–4 mm broad ..... *A. striatus*

9. Pod stipitate, the body narrowed to a stalk at the mouth of the calyx-tube or outside the calyx, this stipe at least as long as the calyx-tube and visible at maturity of the fruit.
    16. Pod conspicuously curved, but less than half a turn, over 5 mm broad, the 2 sutures very prominent ..... *A. sclerocarpus*
    16. Pod nearly or quite straight, if arcuate (except in *A. beckwithii*), not over 5 mm broad.
        17. Calyx at least 8 mm long; pod about 1 cm broad, stipe evidently jointed to the body ..... *A. beckwithii*
        17. Calyx less than 8 mm long or pod much less than 5 mm broad or with stipe not jointed to the body.
            18. Pod from strongly compressed to round in cross-section; strictly 1-celled, the lower suture rarely protruding into the

cavity, partition rudimentary and less than quarter the height of the cavity.

19. Calyx-tube 5–9 mm long; pod oval to round in cross-section ——— *A. collinus*

19. Calyx-tube either less than 5 mm long or pod strongly compressed.

20. Pod black-hairy.

Leaflets usually less than 15 mm long; pod 10–15 mm long ——— *A. bourgovii*

Leaflets usually over 15 mm long; pods usually over 15 mm long ——— *A. robbinsii*

20. Pod not black-hairy.

21. Rachis of leaves seldom as much as 5 cm long; leaflets usually 2–5 mm broad ——— *A. aboriginum*

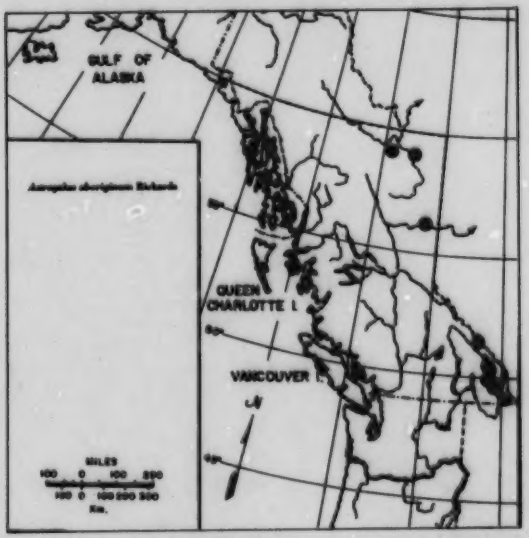
21. Rachis of leaves usually well over 5 cm long; leaflets often less than 2 mm broad.

Body of pod 7–15 mm long; stipe scarcely twice as long as the calyx; leaflets 2–5 mm broad ——— *A. tenellus*

Body of pod mostly over 15 mm long; stipe usually over twice as long as the calyx; leaflets 1–2 mm broad ——— *A. filipes*

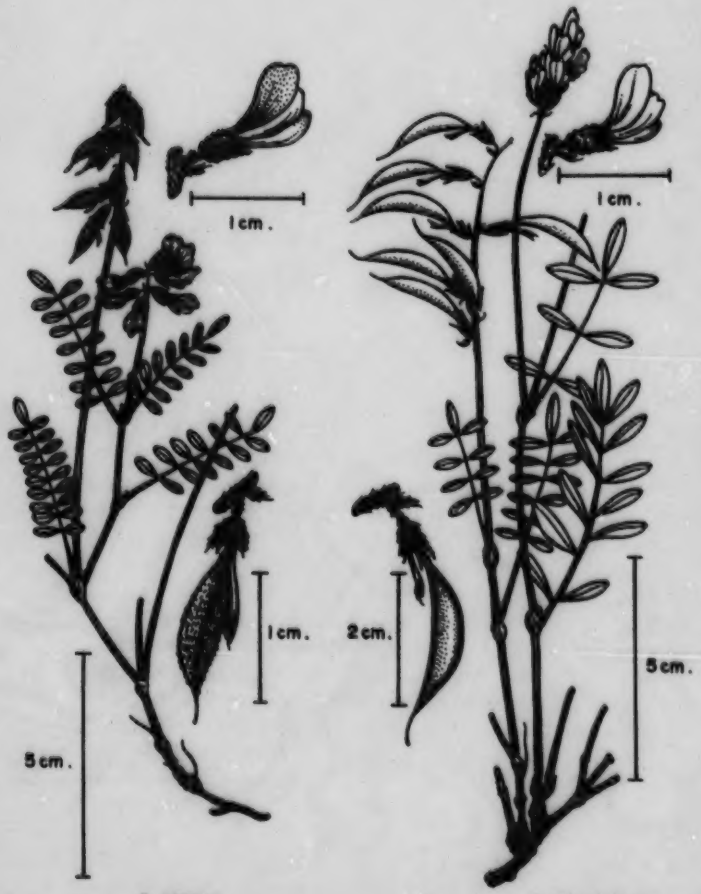
18. Pod round, cordate or triangular in section, or obcompressed, usually with the lower suture rather deeply sulcate, if the pod round or compressed, then the partition extending at least one-third across the cavity ——— *A. alpinus*

1. ***Astragalus aboriginum*** **Richards.**—Perennial from stout woody rootstock with much branched crown. Herbage very variable as to pubescence, ranging from almost glabrous to densely silky-strigillose. Stems prostrate to ascending, up to 30 cm long. Leaves up to 7 cm in length, usually sessile; leaflets 7–15, variable in outline from linear to oblong or linear-elliptic, up to 27 mm long

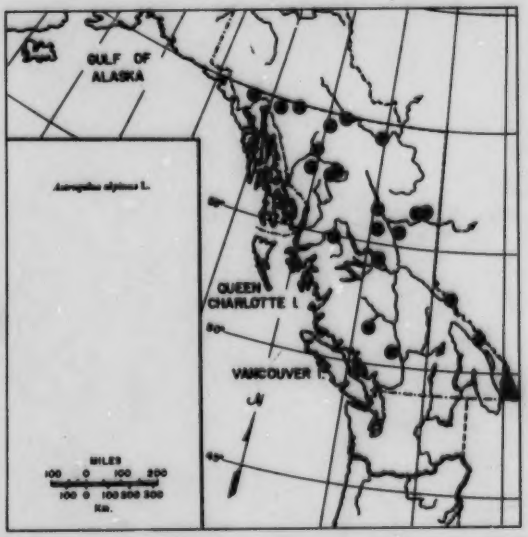


and 7 mm wide; lower stipules large, ovate to suborbicular, purplish, becoming papery and brown, amplexicaul, usually wider than the stem and at most only slightly connate. Peduncles as long as or longer than the leaves; racemes 6- to 30-flowered, compact at first but soon elongated, axis up to 11 cm long in fruit. Calyx 4.5–6.5 mm long, pubescence variable from loosely strigulose to densely villous, hairs black, greyish-brown or white; teeth subulate, from half to as long as the tube. Petals whitish with purple-tipped keel, or purple over all, wings shorter than the standard and deeply bidentate at tip, slightly longer than the keel. Pod pendulous, stipe about as long as the calyx, usually somewhat falcate-lunate, body membranous, greenish, commonly reddish- or purplish-dotted.

Open, often dry situations from alpine regions to lowland open forests; Alaska south along the Rocky Mountains to Colorado, west to northeastern Oregon and Nevada, east to Mackenzie District, Northwest Territories, Manitoba, and the Dakotas; eastern Siberia. Found in northeastern British Columbia, east of Rocky Mountains, and in the upper Columbia Valley.



Alpine milkvetch (left); Indian milkvetch (right).

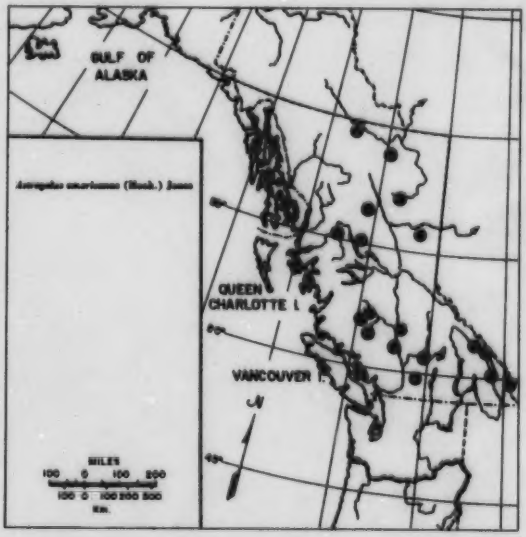


2. *Astragalus alpinus* L.—Low perennial with slender taproot and creeping or obliquely ascending, repeatedly forking, subterranean branches. Stems decumbent, forming leafy tufts; herbage more or less variably pubescent with short curled or sinuous hairs. Leaves up to 11 cm long with a slender petiole; leaflets 15–25, mostly oval to obovate or suborbicular, obtuse or retuse, sometimes lance-elliptic, thin-textured, up to 20 mm long; stipules herbaceous, ovate, obovate or broadly lanceolate, obtuse or subacute, connate, at least at the base and often through half the length, into a loosely amplexicaul sheath. Peduncles either shorter or longer than the leaves. Raceme 7- to 17-flowered; flowers at first ascending, later nodding, axis up to 4 cm long. Calyx 3–6 mm long, usually half the length of the tube, subulate, or triangular-subulate. Petals commonly bicoloured, white toward the base with purple margins or stripes, keel with purple tip, keel shorter than the standard about the same length as the wings. Pod pendulous with slender stipe up to 3 mm long, straight or slightly lunate-incurved, dorsal face widely and shallowly sulcate, valves ultimately greenish straw-coloured,

commonly pubescent with strigillose black hairs, rarely white, sometimes mixed.

Arctic to subalpine situations; circumpolar, south to eastern Oregon and in the Rocky Mountains to northeastern Nevada and New Mexico. General throughout the Interior but apparently absent from the coastal mountains.

3. ***Astragalus americanus*** **(Hook.) Jones**—Robust, caulescent perennial with subterranean root-crown. Herbage glabrous or sparsely villous with more or less spreading hairs. Stems erect, ascending, up to 7 dm tall, stout, often hollow, leafless below, mostly unbranched. Leaves to 16 cm in length, short-petioled below, subsessile above; leaflets 9–13, up to 6 cm long, broadly lance-oblong to elliptic, obtuse, or shallowly emarginate, reticulate veined; stipules very large, leaf-like, oblong, not connate, early deflexed. Peduncles erect, equalling or shorter than the leaf; racemes usually not projecting above the leaves, loose, 10- to 25-flowered. Flowers nodding; axis not much elongated in fruit. Calyx about 6 mm long, glabrous; teeth minute, low deltoid, white

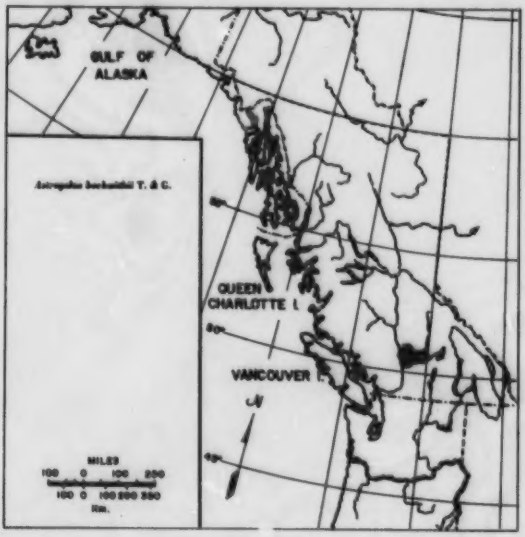


Beckwith's milkvetch (left); Arctic milkvetch (right).

or sometimes black-ciliate. Petals white; standard somewhat recurved, slightly longer than the wings, wings narrower and often shorter than the keel. Pod loosely pendulous; stipe conspicuous, about twice as long as the calyx; body about 3 cm long, tapering to both ends, bladderly inflated, glabrous or minutely black strigose. (*A. frigidus* (L.) Gray var. *americanus* (Hook.) Wats.).

Meadows, edge of woods, stream banks, etc.; Alaska and Yukon south along the Rocky Mountains to northern Colorado, east to James Bay, Quebec, and South Dakota. In British Columbia particularly common in the Thompson and Columbia Valleys.

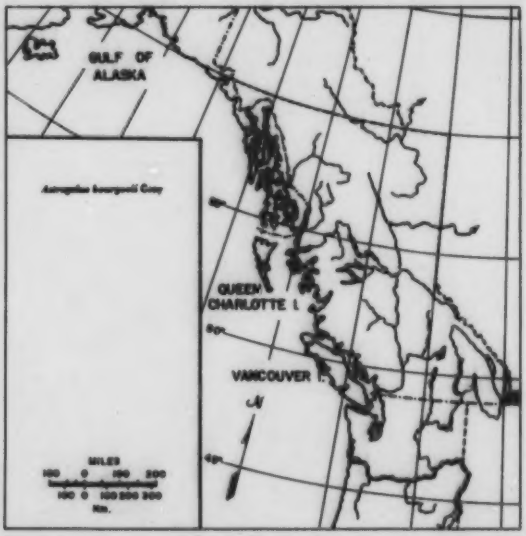
4. ***Astragalus beckwithii*** T. & G.—Caulescent perennial. Herbage glabrous except that the leaflets are often thinly ciliate and the inflorescence may be sparsely black strigillose. Stems from short-forking caudex decumbent, ascending, up to 3.5 dm but rather variable in height, simple or with few branches. Leaves 4–15 cm long, petioled below, shortly so above; leaflets 11–17, up to 25 mm long, ovoid to rhombic-elliptic, obtuse; stipules herbaceous, lowest becoming papery, ovate-lanceolate, not connate.



Peduncles erect, shorter than the leaf. Racemes loosely 5- to 16-flowered; axis 1–7 cm long in fruit. Calyx 10–13 mm long; teeth about as long as the tube, lance-subulate, the whole becoming marcescent. Petals yellowish-white (with us); standard abruptly recurved, wings about the same length as the standard and longer than the keel. Pod erect, spreading, stipe stout, jointed to the body; body inflated, strongly obcompressed, about 1 cm broad, upper suture prominent, valves glabrous, often mottled.

Dry, usually heavy, clay soils; southern British Columbia south, east of Cascades to Nevada and Utah, east to Idaho. Known only from the Lower Thompson Valley between Spences Bridge and Kamloops.

5. ***Astragalus bourgovii*** **A. Gray**—Low, slender perennial, with taproot and loosely forking caudex. Vestiture basifixed, thin to densely strigillose with fine, straight, appressed hairs. Stems usually several, weak, decumbent, ascending to 15 cm long, simple or sparingly branched at base. Leaves up to 9 cm long, short-petioled to subsessile; leaflets 11–19, 3–17 mm long, from oblong-

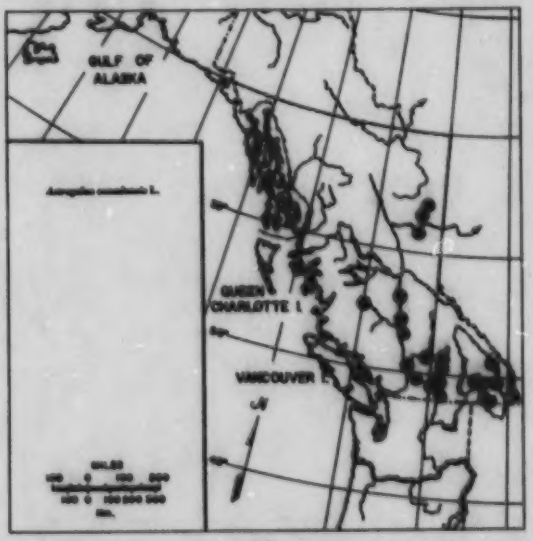


Bourgeau's milkvetch (left); Canada milkvetch (right).

lanceolate to broadly oval, midvein rather prominent beneath; stipules mostly amplexicaul, connate into a papery-scarious sheath. Peduncle slender, weak, commonly decumbent in fruit, longer than the leaves. Racemes loosely 3- to 13-flowered; axis 2–8 cm long in fruit. Calyx 4.5–6.7 mm long, densely strigillose with black, rarely white, hairs, teeth linear-lanceolate, about half the length of the tube. Petals pink-purple, less commonly pale (drying yellow), purple tipped; wings considerably longer than the standard and slightly longer than the keel. Pod loosely pendulous; stipe about 1 mm long; body oblong-elliptic, straight, strongly compressed laterally, black strigillose.

Alpine and subalpine regions, commonly on limestone; Rocky Mountains from about Columbia Icefields south to Montana. Found only in extreme southeastern British Columbia.

6. ***Astragalus canadensis*** L.—Robust, caulescent perennial from spreading rhizome. Vestitute dolabriform, densely strigillose with straight, appressed hairs. Stems erect, up to 10 dm tall, simple or branched upward, often fistular. Leaves up to 35 cm long, short-petioled below, subsessile above; leaflets 13–35, broadly



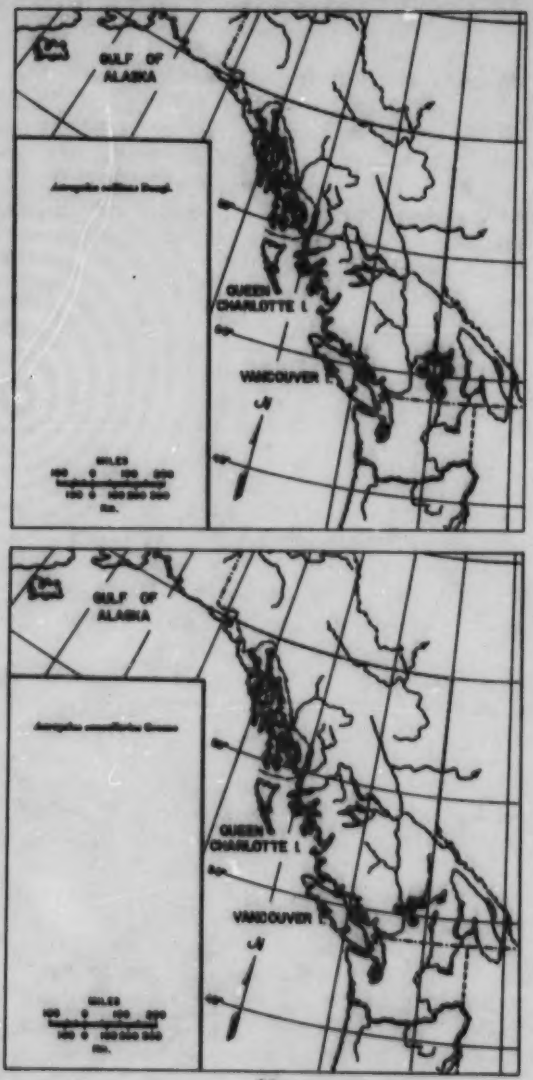
lanceolate to elliptic, obtuse, rarely obcordate; stipules deltoid-acuminate or lanceolate, amplexicaul, connate into a bidentate sheath, thinly pubescent dorsally. Peduncle stout, erect, up to 20 cm tall. Raceme densely many-flowered, in full anthesis forming compact cylindrical spikes. Calyx 5–10 mm long, strigillose or pilosulous with white, greyish-brown, or black hairs; teeth linear-subulate about half the length of the tube. Petals commonly greenish white or cream-coloured; standard slightly longer than the wings and 1–2 mm longer than the purple-tipped keel. Pod erect, sessile, oblong-ellipsoid, rounded or truncate at base, abruptly contracted apically into a strong, sharply pointed beak, cordate-terete in section, fully 2-celled, commonly strigillose (*A. mortonii* Nutt.).

In a great variety of sites from open coniferous forests to rich-soiled meadows and rocky bluffs; widely distributed in North America, except along the Pacific Coast. Found throughout the southern Interior.

7. ***Astragalus collinus*** **Dougl.**—Usually a robust, caulescent perennial with a shallowly subterranean or superficial caudex. Vestitute basifixed, villous with fine, ascending hairs. Stems several, to 4 dm tall, ascending to nearly erect, forming clumps, commonly leafless below, usually branched below the middle. Leaves up to 9 cm long, lower short-petioled, upper subsessile; leaflets 11–21, oblong-oblanceolate to linear-elliptic, commonly truncate-retuse; stipules lanceolate or triangular-acuminate, free. Peduncles erect, usually longer than the leaves. Racemes 15- to 40-flowered, dense at first, looser and reflexed in full anthesis, axis 4–12 cm fruit. Calyx 7–12 mm long, villous with white and some black hairs, gibbous-saccate at base; teeth broadly lanceolate to deltoid, about one-third the length of the tube. Petals cream-coloured; standard only slightly upturned, wings longer than the standard, about equalling the keel. Pod pendulous, stipitate with a long, straight stipe; body linear to lance-oblong in outline, tapered at both ends, compressed, bicarinate, villous.

Sandy and stony soils in grassland and sagebrush; southern British Columbia to Oregon, east to western Idaho. Limited to the Okanagan Valley south from Kamloops.

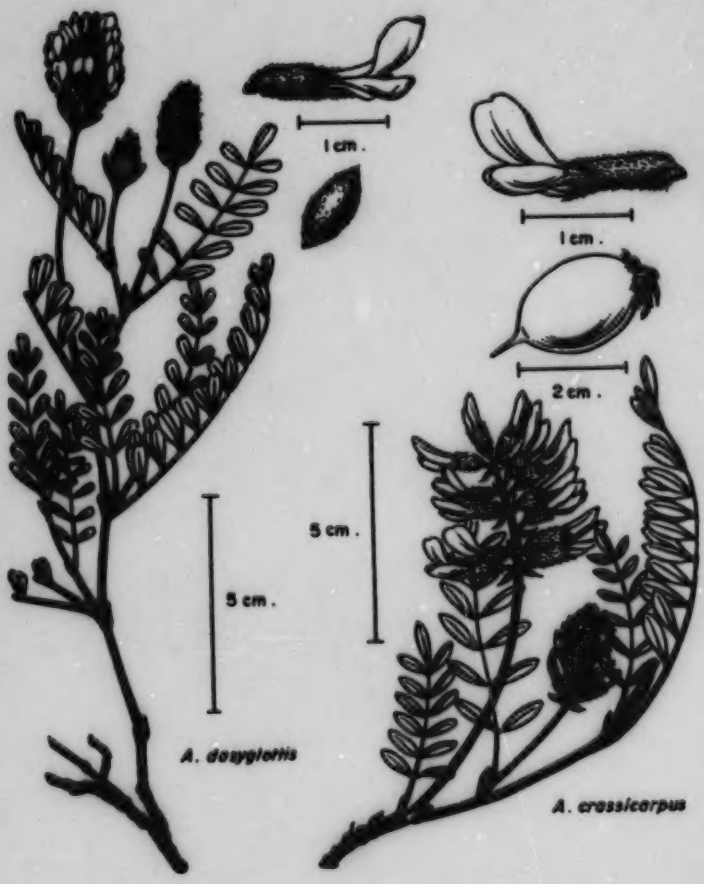
Lesser rushy milkvetch (left); Hillside milkvetch (right).


GULF OF ALASKA
QUEEN CHARLOTTE I.
VANCOUVER I.
GULF OF ALASKA
QUEEN CHARLOTTE I.
VANCOUVER I.

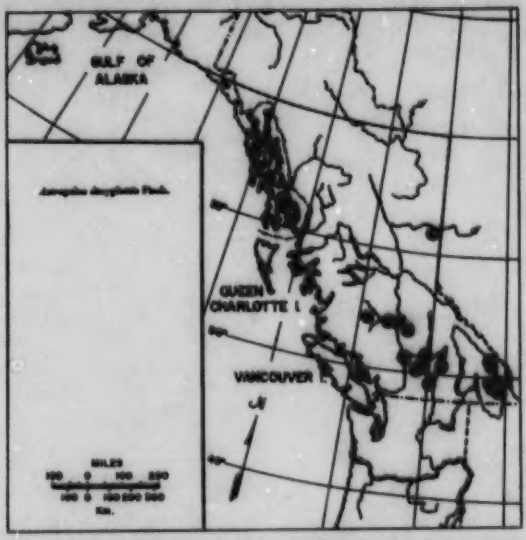
8. *Astragalus convallarius* Greene — Rush-like perennial. Herbage minutely strigillose with basifixed hairs. Stems erect to 6 dm tall. Stipules short, triangular, about 3 mm long, at least the lowermost connate, the upper free. Leaves 4–12 cm long, the rachis broadened, as much as 1.5 mm wide; leaflets, often lacking on many of the leaves, if present 7–9, linear and hardly as broad as the rachis, up to 3 cm long, terminal confluent with the rachis and indistinguishable from it; stipules 3 mm long. Racemes 8- to 20-flowered; peduncles shorter or longer than the leaves. Flowers yellowish to purplish, 8–12 mm long; pedicels less than 2 mm long. Calyx about half as long as the corolla, teeth about one-third the length of the tube. Standard strongly reflexed, wings and keel subequal to it in length. Pod sessile, pendulous, linear, 20–40 mm long, about 2 mm broad, strigillose, compressed, 1-celled (*A. campestris* Gray not L.).

Grasslands and sagebrush areas; south central British Columbia to southeastern Idaho, south central Montana, south to Wyoming and Utah. Rare in the dry Interior.

9. *Astragalus crassicarpus* Nutt. — Fleshy perennial with thick, fleshy taproot and branched crown. Herbage minutely strigillose, greenish. Stems prostrate to ascending, up to 5 dm long; stipules as much as 8 mm long, lanceolate, not connate. Leaflets 13–21, oblong-oblanceolate to elliptic, 5–20 mm long, rather fleshy, greenish, glabrous above, strigillose below. Racemes 5- to 20-flowered, usually shorter than the leaves; pedicels not more than 3 mm long; flowers up to 30 mm long, spreading. Calyx commonly subtended by 2 membranous bracts, tubular, more or less blackish-strigillose, about half as long as the corolla, teeth lanceolate about one-third the length of the tube. Standard usually white, varying to purplish, oblanceolate, retuse; wings about equalling the standard, blade auriculate, whitish but usually purplish-tinged; keel much shorter than the wings, rounded, purple. Pods sessile, subglobose, glabrous, about 2.5 cm long, very fleshy (hard when dry), indehiscent, nearly terete in section, almost completely 2-celled.



Purple milkvetch (left); Ground plum (right).


GULF OF
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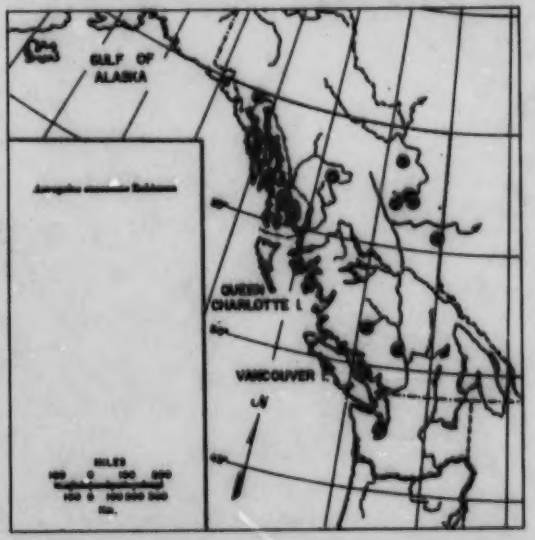
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Prairies and foothills, generally east of the Rocky Mountains; southern Alberta and Saskatchewan, south to New Mexico, east to Missouri, Tennessee, and Texas. Known in British Columbia only from the Crow's Nest region.

10. ***Astragalus dasyglottis*** **Fisch.**—Slender, tufted, but weak-stemmed perennial with widely forking, subterranean caudex. Herbage thinly strigillose-pilose with fine, appressed basi-fixed hairs. Stems up to 25 cm high, simple, leafless below and subterranean for a short distance. Leaves up to 10 cm long, short-petioled; leaflets 13–21, lanceolate to oval, mostly obtuse or retuse. Peduncles relatively stout, erect, either longer or shorter than the leaves. Racemes densely 5- to 15-flowered, crowded into an ovoid or subglobose head, axis not, or scarcely, elongating in fruit, about 17 mm long. Calyx 8.5–12.5 mm long, densely or variably pubescent with mixed black and white hairs; teeth linear-lanceolate, somewhat shorter than the tube. Petals magenta-purple with whitish wing tips; standard longer than the wings and keel considerably shorter. Pod sessile, erect, substipitate, body ovoid, 1 cm or less long, cordate in section, deeply sulcate, completely 2-celled by the intrusion of the dorsal suture (*A. agrestis* Dougl., *A. goniatus*, Nutt.).

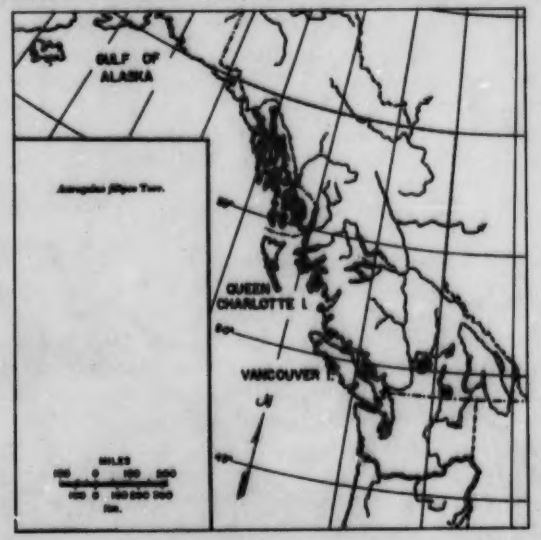
Moist meadows and cool slopes; Alaska and Yukon southeast of coastal mountains to northern to northern California and New Mexico, east to James Bay, Minnesota, and Wisconsin. General in the Interior, particularly in the Okanagan and Columbia Valleys.

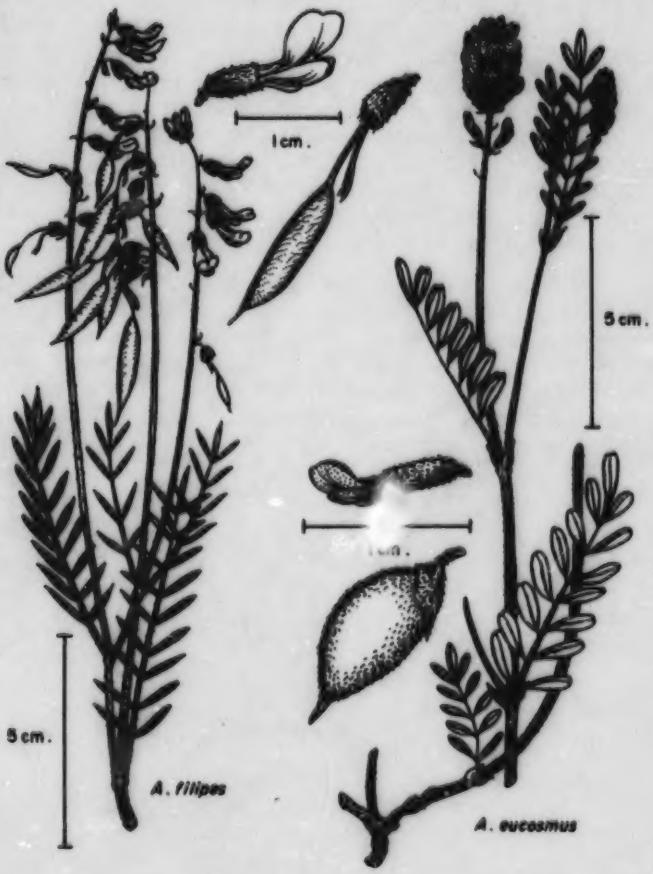
11. ***Astragalus eucosmus*** **Robbins.**—Caulescent, taprooted perennial with superficial caudex. Vestitute basifixed, sparsely strigillose with fine, appressed black or greyish-brown hairs. Stems decumbent, incurved ascending, up to 4 dm long, simple, leafless below. Leaves to 10 cm long, short-petioled to subsessile; leaflets 9–15, 6–20 mm long, oblong to oblanceolate, obtuse or emarginate; stipules broadly ovate below, lanceolate above, free or slightly connate at base. Peduncles strictly erect, considerably longer than the leaf. Racemes 7- to 25-flowered, compact, quickly elongating, flowers becoming secund and early declined. Calyx 4–5 mm long, strigillose with black, grey, or rarely white hairs; teeth subulate,

less than half as long as the tube. Petals purplish, exceptionally white; standard slightly upturned, wings narrow, considerably shorter than the standard but longer than the keel. Pod deflexed, sessile or nearly so, up to 13 cm long, tapered at both ends, shortly cuspidate at the apex, somewhat turgid, more or less triquetrous, lower suture intruded to form a partial partition; valves densely strigillose with black or grey hairs.

Stream banks, river bars, and open montane forests; Alaska south along the Rocky Mountains to Colorado, east to Newfoundland, Quebec, and Nova Scotia. Known from northern British Columbia south to Lillooet.

12. ***Astragalus filipes*** **Torr.** — Caulescent perennial with thick, woody taproot and branched caudex. Vestitute basifixed, from nearly glabrous to densely strigillose with straight appressed hairs. Stems several to numerous, commonly erect, up to 6 dm tall, mostly paniculately branched, sometimes simple. Leaves up to 10 cm long, commonly all short-petioled; leaflets 9–19, linear-filiform; stipules triangular, connate below, free above. Peduncles



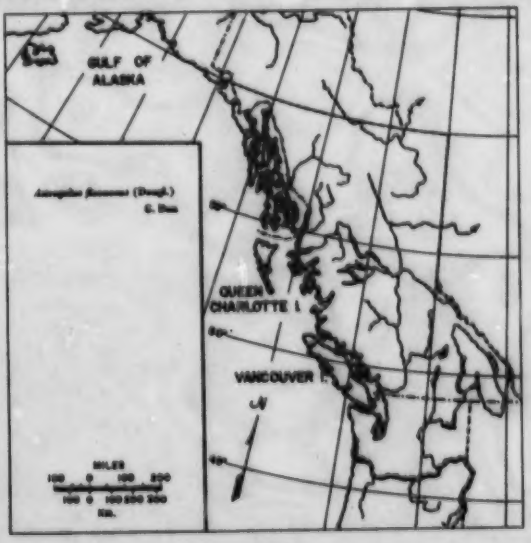


Threadstalk milkvetch (left); Elegant milkvetch (right).

erect, longer than the leaves. Racemes loosely 10- to 30-flowered; flowers more or less secund, soon declined, axis elongating in fruit. Calyx 4–6 mm long, thinly or densely strigillose with black or mixed black and white hairs; teeth triangular, scarcely 1 mm long. Petals whitish; standard somewhat recurved, wings rounded, shorter than the standard but longer than the keel. Pod pendulous with a longer slender stipe; body greenish, not mottled, straight, tapered at both ends, apiculate, strongly compressed, 1-celled, sutures prominent but not sulcate (*A. stenophyllus* recent Am. Auth.).

Sagebrush flats; southern British Columbia to California, east to Idaho and Nevada; Baja California. Found in the Nicola Valley and south Okanagan Valley.

13. *Astragalus flexuosus* (Dougl.) G. Don—Caulescent perennial, caudex subterranean. Vestiture basifixed, appressed ascending, rarely incurved. Stem decumbent with ascending tips, commonly branched. Leaves 2–9 cm long, lowest short petioled, upper subsessile; leaflets 11–25, 3–19 mm long, linear or narrowly oblong-lanceolate; stipules dimorphic, lowest amplexicaul and con-



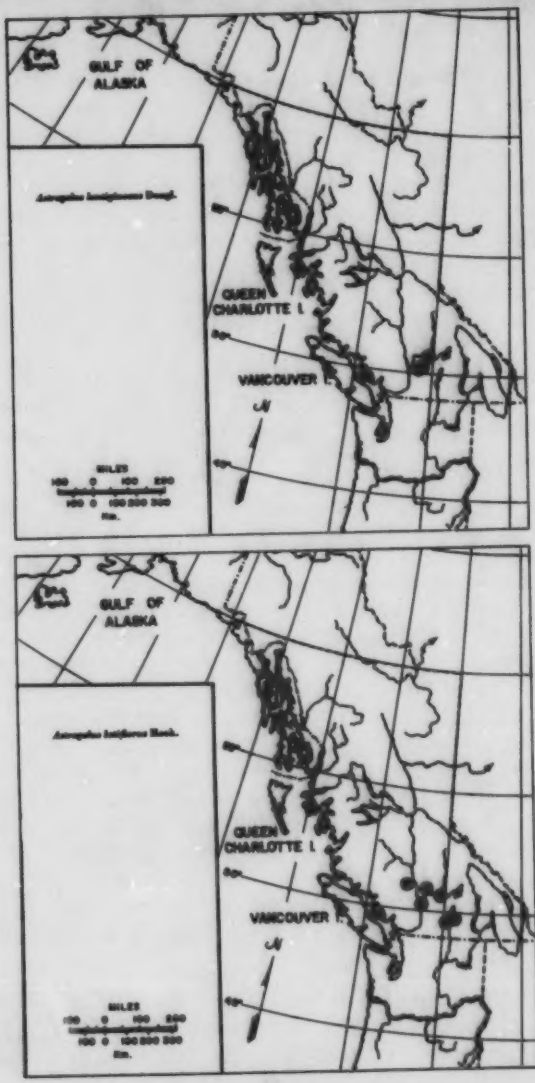
nate, upper triangular to lance-acuminate, connate at base only. Peduncles 4–19 mm long, mostly incurved-ascending, shorter or longer than the leaf. Raceme loosely 10- to 30-flowered, axis elongating to as much as 13 cm in fruit. Calyx 4–6 mm long, strigillose-pilose with white, mixed black, or black hairs; teeth subulate, about one-quarter the length of the tube. Petals white to lavender-purple; standard recurved, wings about as long as the standard, keel shorter. Pod stipitate or subsessile; stipe concealed by the marcescent calyx; body linear oblong, 12–24 mm long, acute at both ends, straight, nearly terete, 1-celled, finely strigillose, rarely glabrous.

Grassy hillsides and plains; Alberta to New Mexico, east to Saskatchewan, Minnesota, and Kansas. Reported from southeastern British Columbia by Barneby.

14. ***Astragalus lentiginosus*** **Dougl.**—Perennial with stout taproot and much branched caudex. Vestiture basifixed, thinly strigillose, with subappressed straight hairs. Stems decumbent or prostrate, up to 3 dm long, commonly simple. Leaves up to 10 cm long, mostly rather long-petioled; leaflets 9–17, 5–15 mm long, broadly obovate, sometimes suborbicular or oblanceolate, obtuse or retuse; stipules lanceolate, free. Peduncles up to 3.5 cm long, incurved-ascending, mostly shorter than the leaves. Racemes closely 8- to 18-flowered, axis elongating to 3 cm in fruit. Calyx 3–6 mm long, thinly strigillose with black, white, or mixed hairs; teeth subulate, about half the length of the tube. Flowers spreading or erect, whitish; standard longer than both wings and keel, latter two about same length. Pod sessile, spread on the ground 1–2.3 cm long, strongly to scarcely inflated, curved, rounded at base, tapering to a beak, pale green often purple-speckled, commonly thinly strigillose, 2-celled except at beak.

Dry plains and hillsides; widespread over much of western United States. Apparently localized around Kamloops and in the Nicola Valley.

15. ***Astragalus lotiflorus*** **Hook.**—Low, tufted, acaulescent, short-lived perennial with shortly branching caudex. Vestiture dolabriform, usually densely pubescent with fine hairs. Stems 1 to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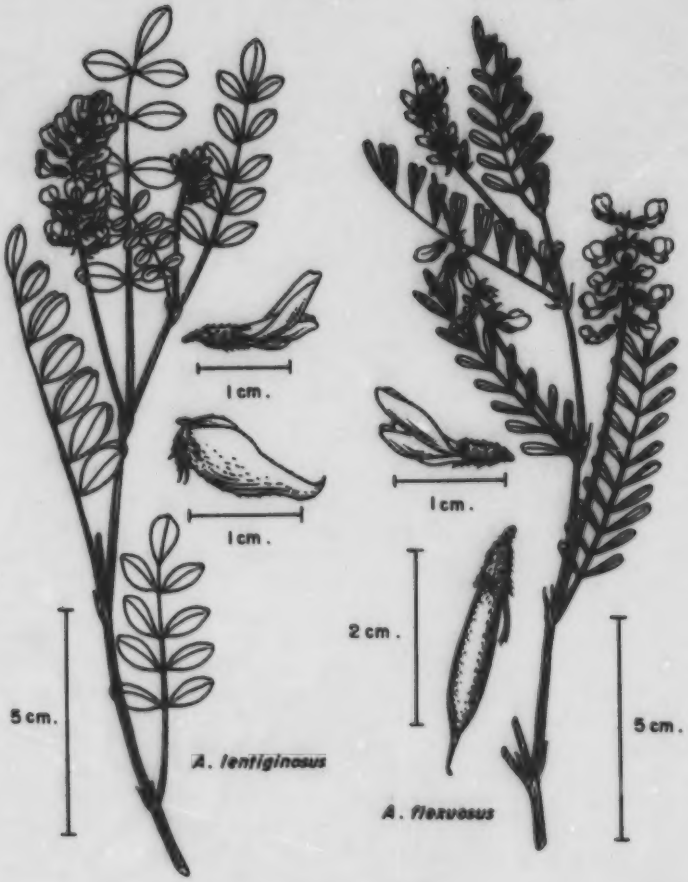
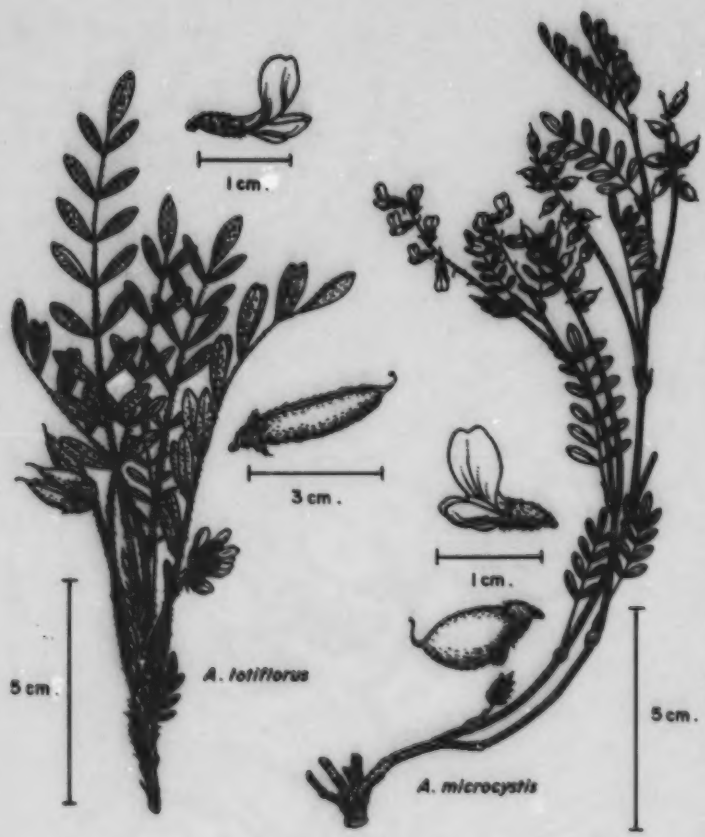


Freckled milkvetch (left); Wiry milkvetch (right).

several from almost 0–7 cm long, decumbent, or prostrate on outside of the tuft. Leaves up to 11 cm long, short-petioled; leaflets 7–17, terminal commonly longer than the last pair, elliptic to obovate-cuneate; stipules broadly deltoid to lanceolate, free. Peduncles up to 2 cm long for cleistogamous flowers, and 12 cm for chasmogamous. Racemes 2- to 12-flowered. Flowers 7–10 mm long, mostly subsessile, yellowish-white to purple-tinged or veined, cleistogamous flowers one-half to two-thirds this size. Calyx 5–10 mm long; teeth lanceolate, about half the length of the tube. Standard recurved, wings slightly shorter than the standard and slightly longer than the keel. Pod up to 3.7 cm long, sessile, ascending, or loosely spreading, ovoid-acuminate to narrowly oblong-ellipsoid, inflated, somewhat curved, slightly obcompressed, 1-celled, strigillose or villous.

Prairies, well-drained sites; southern British Columbia and Alberta south to Montana and New Mexico, east to Saskatchewan, Minnesota, Indiana, and Texas. Thompson Valley from Lytton to Kamloops and in the southern Okanagan.

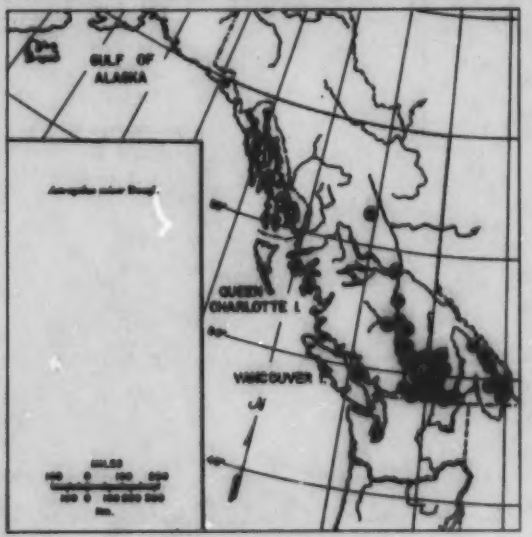
16. ***Astragalus microcystis*** **Gray**—Low, caulescent perennial with somewhat slender taproot, caudex loosely forking. Vestiture basifixed, strigillose-pilose with sinuous or straight subappressed hairs. Stems many, decumbent and ascending, branched below. Leaves up to about 6 cm long, petiolate or the upper subsessile; leaflets 9–13, 3–14 mm long, narrowly to broadly elliptic or oblanceolate; stipules dimorphic, the lower amplexicaul and connate, the upper longer and narrower, very shortly connate or free. Peduncles solitary, rarely 2–3 in some axils, slender, rarely surpassing the leaves. Racemes loosely or remotely 4- to 12-flowered; flowers early declined; axis less than 4.5 cm in fruit. Calyx about 3 mm long, densely strigillose-pilose with white or mixed white and black hairs; teeth lance-subulate to subsetaceous, about half the length of the tube. Petals spreading, purplish to pink, the standard prominently purple-veined, recurved, deeply emarginate; wings slightly shorter than the standard and longer than the keel. Pods spreading to declined, sessile, plumply ellipsoidal, bladderly inflated, 8–12 mm long, slightly compressed, 1-celled.



Lotus milkvetch (left); Lesser bladdery milkvetch (right).

Open places, often in heavy soil; southeastern British Columbia to Washington and Montana. Known with us only from the upper Columbia Valley.

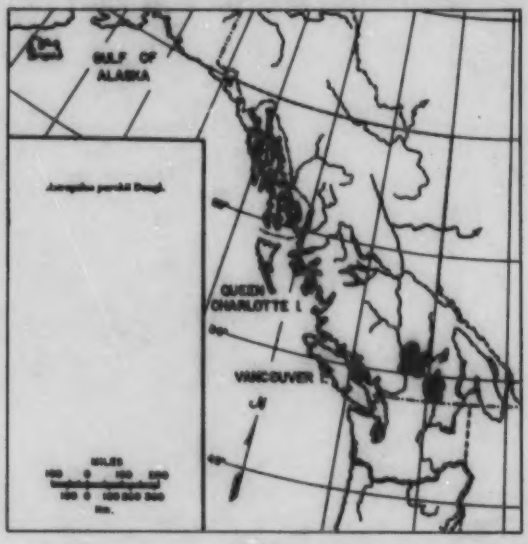
17. *Astragalus miser* Dougl.—Tufted perennial with woody taproot and much branched caudex. Vestiture basifixed in ours, dolabriform southward, thinly to densely pubescent with appressed, commonly straight hairs. Stems numerous, arising from the caudex or a little above ground-level, decumbent or ascending, up to 4 dm tall. Leaves less than 20 cm long, slender-petioled; leaflets 7–21, linear-filiform to broadly oval, terminal commonly longer than the adjacent pair, somewhat remote; stipules less than 9 mm long, amplexicaul, connate. Peduncle slender, incurved-ascending, about the length of the leaves. Racemes 2- to 20-flowered, varying from loose to compact, flowers spreading to more or less declined, axis elongating in fruit. Calyx 2.3–6 mm long, strigillose with black, white, or mixed hairs; teeth subulate, 1 mm long or less, the whole becoming papery-marcescent. Petals whitish or yellowish, sometimes quite bluish, keel-tip usually lilac-spotted, often veined or



suffused with lilac, sometimes entirely pinkish; standard recurved, slightly longer than the wings, keel also slightly longer than the wings. Pod pendulous, sessile or substipitate, stipe less than 1 mm long, linear oblong or linear oblanceolate, up to 2.5 cm long, compressed or more or less terete, 1-celled (*A. serotinus* Gray, *A decumbens* (Nutt.) Gray).

Low grasslands to alplands; east of coastal mountains from southern British Columbia to Nevada, Utah, and Colorado, east to Alberta and South Dakota. Common throughout the Interior south from about Lat. 55°N.

18. ***Astragalus purshii*** **Dougl.**—Subacaulescent or shortly caulescent perennial, loosely to densely tufted with a woody taproot and slenderly branched caudex. Vestiture densely villous or pannose with fine, white hairs. Stems less than 10 cm tall. Leaves crowded, less than 12 cm long, slender-petioled, white tomentose; leaflets 5–17, broadly obovate-cuneate to narrowly elliptic; stipules membraneous, ovate to lance-acuminate, usually longer than the internodes, free but decurrent. Peduncles ascending or erect, com-

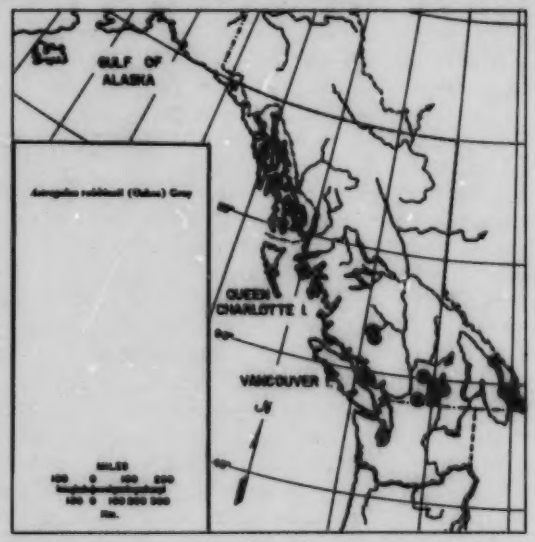


Weedy milkvetch (left); Woolly-pod milkvetch (right).

monly shorter than the leaves, sometimes almost lacking, arcuate-procumbent in fruit. Racemes 2- to 6-flowered, subcapitate, axis scarcely elongating in fruit. Flowers yellowish to deep reddish-purple. Calyx 12–16 mm long; teeth linear-lanceolate to subulate, about one-third the length of the tube, black to greyish hairy. Standard slightly recurved, longer than the wings, keel shorter than the wings. Pod ovoid-acuminate or broadly lance-ellipsoid, 1.3–2.3 cm long, lunately curved; valves hard, obcompressed, shaggy woolly, 1-celled (*A. glareosus* Dougl.).

Sagebrush deserts and dry grassland; southern Britsh Columbia (east of coastal mountains) to northern California, east to Alberta, the Dakotas, Utah, Nevada, and New Mexico. Found in the Nicola and Okanagan Valleys.

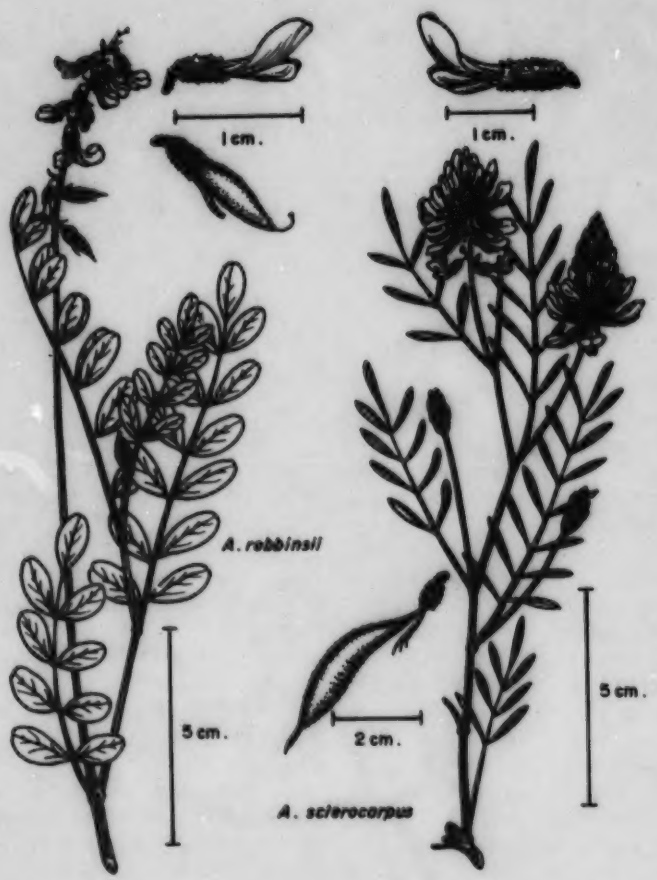
19. ***Astragalus robbinsii*** **(Oakes) Gray**—Caulescent perennial with taproot and superficial caudex. Vestiture basifixed, thinly to quite densely strigillose with straight, more or less appressed hairs. Stems 2–4 dm long, usually ascending, or trailing in exposed sites. Leaves up to 12 cm long; leaflets 9–13, 7–25 mm



long, strigillose beneath, glabrescent above, exceptionally glabrate throughout; stipules dimorphic, lowest connate, broadly ovate, obtuse, the upper ovate-lanceolate, free. Peduncles 4.5–16 cm long, incurved ascending or erect, longer than the leaves. Racemes 6- to 21-flowered, moderately compact at first, later with the axis elongating considerably in fruit, becoming about as long as the peduncle. Calyx 4–6.8 mm long, thinly strigillose to densely strigillose-villous with black or paler hairs; teeth subulate, about one-third the length of the tube. Petals pale purple with white claws; keel shorter and about the same width as the wings, much shorter than the gently recurving standard. Pod essentially pendulous, stipe 1.3–2.5 cm long, about equalling the calyx, body elliptic in outline, compressed, tapered at both ends, loosely strigillose-pilous with black, or mixed black and white, hairs (*A. macounii* Rydb.).

Stream sides and alpine slopes; Alaska to Washington (east of Coast Mountains), Idaho, Montana, Nevada, and Colorado, east to Great Bear Lake and Alberta, eastern Canada and northeastern United States. Known in the Interior from the Cariboo southward.

20. ***Astragalus sclerocarpus*** **Gray**—Caulescent perennial, diffuse and wiry with a long, woody taproot, caudex shortly branched. Vestiture basifixed with straight, appressed, somewhat flattened hairs. Stems up to 5 dm long, decumbent, ascending or straggling, leafless at the base, branched below, simple above. Leaves 5–13 cm long, short-petioled or the upper subsessile; leaflets 7–17, up to 23 mm long, distant, filiform, linear or rarely narrowly oblong; lower stipules broader than long, upper narrower, triangular, not connate. Peduncles up to 9.5 cm long, nearly always shorter than the leaves. Racemes 7- to 21-flowered, axis elongating to 3–7 cm long in fruit. Calyx 6–8 mm long, finely strigillose with black hairs; teeth broadly subulate, about one-quarter the length of the tube. Petals whitish with tips tinged with lilac or purple; standard slightly longer than the wings, keel somewhat shorter. Pod pendulous, very long stipitate, stipe gradually expanded into the body, body straight when young, later curved nearly to half circle, 2–3 cm long, strongly compressed, greyish-strigillose to nearly glabrous, 1-celled.



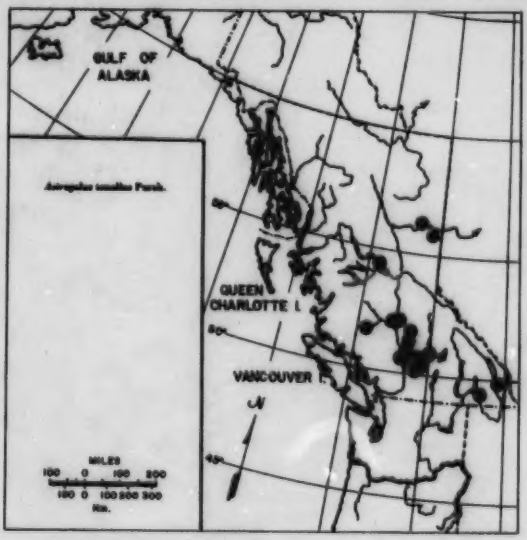
Robbin's milkvetch (left); Stalked-pod milkvetch (right).

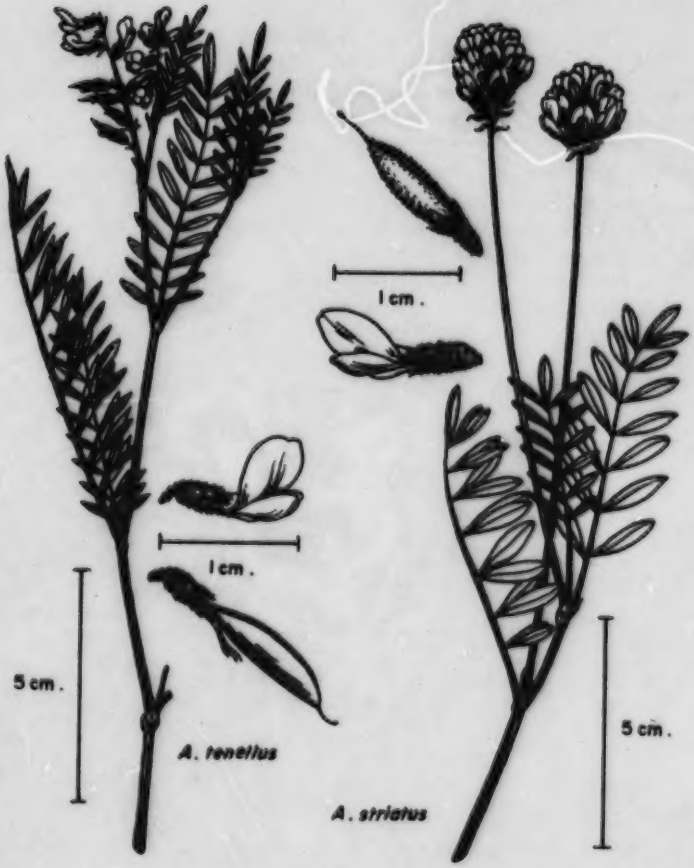
Dunes and sandy places; northern Oregon, eastern Washington, to southern British Columbia. Very local, known only from the south Okanagan.

21. ***Astragalus striatus*** **Nutt.**—Coarse perennial with woody rootstock and shortly forking caudex. Herbage strigillose with fine, straight, dolabriform hairs. Stems, up to 3 dm tall, ascending from decumbent base, commonly simple. Leaves up to 17 cm long; leaflets 11–25, variable but often rather broad in outline, 8–27 mm long. Peduncles frequently twice as long as the leaves. Racemes dense with 16–50 flowers, elongating little in fruit. Flowers 14–18 mm long. Calyx up to 10 mm in length, strigillose with mixed black and white hairs; teeth subulate, from ½ to as long as the tube. Petals variable from purple to white (keel then purple-tipped); standard slightly longer than the wings and considerably longer than the keel. Pod sessile, erect, ovoid to lance-ellipsoid, 7–12 mm long, densely pubescent with mixed black and white, or all white, hairs (*A. adsurgens* Pall.).

Rocky and gravelly soil, open grassland; Alaska to Manitoba, south along the Rocky Mountains to New Mexico, west to Washington and Idaho, east to Minnesota and Wisconsin. Known with us only from the Peace River region.

22. ***Astragalus tenellus*** **Pursh**—Strongly caulescent perennial with thick taproot and knotty caudex at soil level. Vestiture basifixed, thinly strigillose nearly throughout with fine, straight appressed hairs, inflorescence often black pubescent. Stems up to 4 dm tall, several to numerous, commonly erect and ascending in bushy clumps, branching at or above the middle, plants of high altitudes may be more or less prostrate. Leaves up to 8 cm long, all but the lowest sessile; leaflets 11–21, as much as 22 mm long, linear-lanceolate to linear-oblanceolate; stipules more or less dimorphic, the lowest amplexicaul and connate for half its length, the upper less connate, lance-acumunate. Peduncle slender, incurved-ascending, much shorter than the leaves and raceme axis; racemes 4- to 20-flowered, axis elongating to as much as 10 cm in fruit, flowers at first ascending, later declined. Calyx less than 5 mm



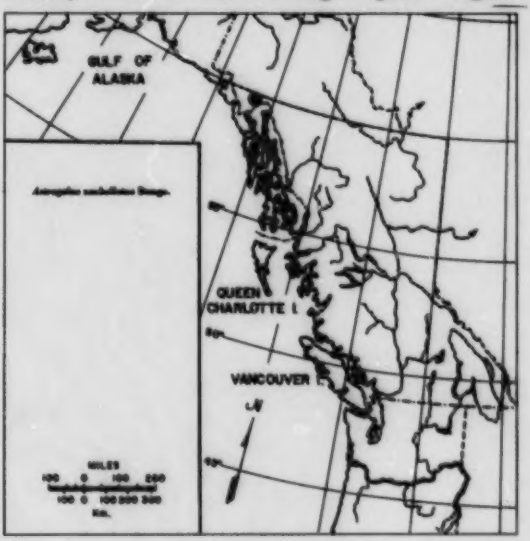


Pulse milkvetch (left); Standing milkvetch (right).

long, strigillose with black or white or mixed hairs, teeth subulate, about three-quarters the length of the tube. Corolla white, concolorous or with purple keel-tip; banner recurved, slightly longer than the wings; wings clearly longer than the keel. Pods to 17 mm long, pendulous, stipitate with the stipe evident, 1–2 times as long as the calyx; body tapered at each end, strongly compressed, oblong-elliptic in outline, glabrous, 1-celled (*A. multiflorus* Gray).

Open places from low to moderately high elevations; Yukon and British Columbia, south along the Rocky Mountains to Nevada, New Mexico, east to Manitoba, Minnesota, and western Nebraska. Fairly common in the drier parts of the Interior.

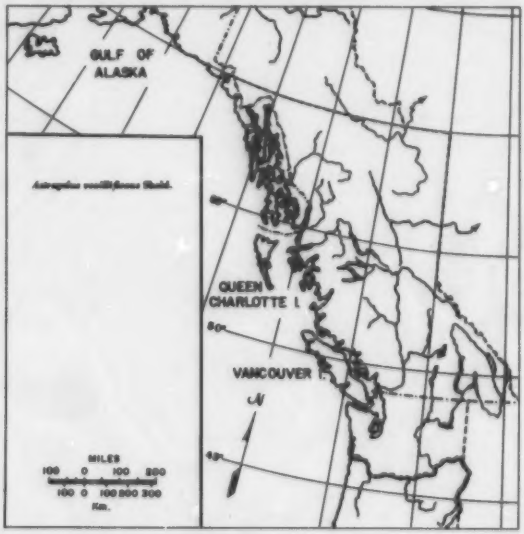
23. *Astragalus umbellatus* Bunge.—Caulescent perennial with subterranean caudex and stolon-like creeping caudex branches. Vestiture basifixed, villous with fine, loosely ascending or spreading, nearly straight hairs. Stems up to 15 cm tall, erect or ascending, simple, leafless at base. Leaves up to 10 cm long, lower short-petioled, upper sessile; leaflets 7–11, about one-third as long as the leaves, broadly ovate to lance-oblong; stipules large, ovate to

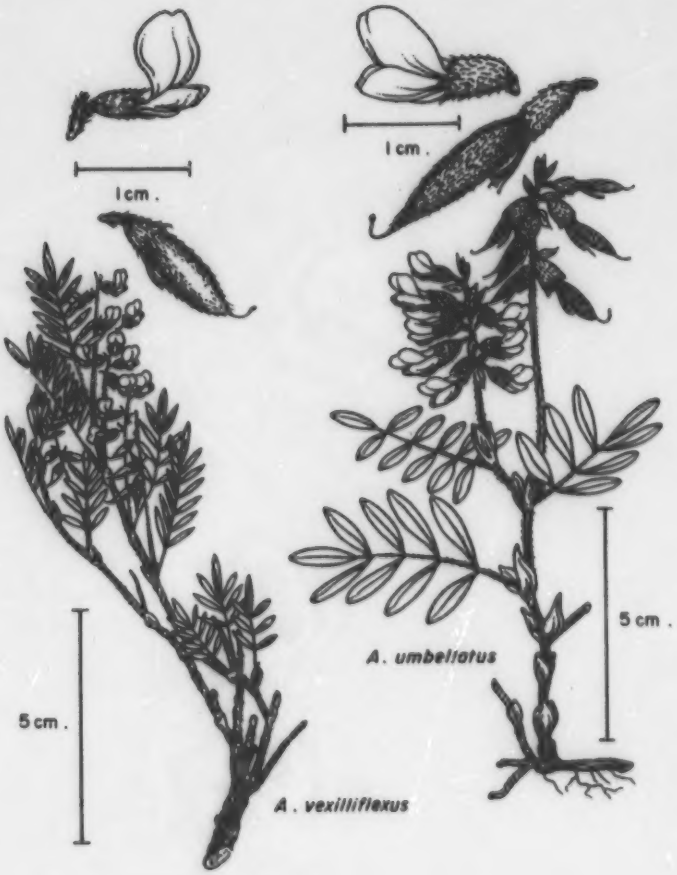


broadly lanceolate, the lowest connate, amplexicaul, the upper free but amplexicaul. Peduncles erect, always longer than the leaves. Racemes 5- to 11-flowered with umbel-like heads, axis elongating little in fruit, flowers nodding at anthesis. Calyx about 8 mm. long, villous with curling, dark hairs; teeth broadly triangular, one-fifth the length of the tube or less. Corolla cream-coloured; standard gently recurved; wings slightly shorter than the standard and somewhat longer than the keel. Pods pendulous, stipitate, but stipe shorter than the calyx, body about 2 cm long, inflated, obliquely lance-ellipsoid, tapering to both ends, valves densely dark villous.

Arctic and subarctic tundra; Alaska, Yukon, Mackenzie delta; Siberia. Known only from the Haines Road.

24. *Astragalus vexilliflexus* Sheld.—Low, often matted perennial with stout, woody taproot with branched caudex. Vestiture basifixed, thinly to densely strigillose with fine straight hairs. Stems up to 3 dm long, several, usually much branched, prostrate, decumbent with ascending tips. Leaves less than 5.5 cm long, short-petioled or the upper subsessile; leaflets 7–13, up to 12 mm long,





Bent-flowered milkvetch (left); Umbellate milkvetch (right).

commonly crowded, narrowly linear-elliptic to oblanceolate; stipules dimorphic, the lower amplexicaul and connate, the upper connate for half their length or less with herbaceous, lance-acuminate blade. Peduncles equalling or shorter than the leaves; racemes loosely 3- to 7-flowered, flowers ascending, axis somewhat shorter than the peduncle. Calyx not more than 4.5 mm long, strigillose with white and sometimes partly black hairs; teeth linear-subulate about equalling the tube. Corolla pink-purple to yellowish-white keel usually purple-tipped; standard abruptly recurved, wings shorter than the standard and longer than the keel. Pods loosely deflexed, sessile, body up to 12 mm long, nearly straight, elliptic to oblong-elliptic, commonly cuneate at base, valves densely strigillose, 1-celled.

Open, rocky situations or sagebrush deserts; southeastern British Columbia to Saskatchewan, south along the Rocky Mountains to Wyoming. Reported from the southeast corner of the Province.

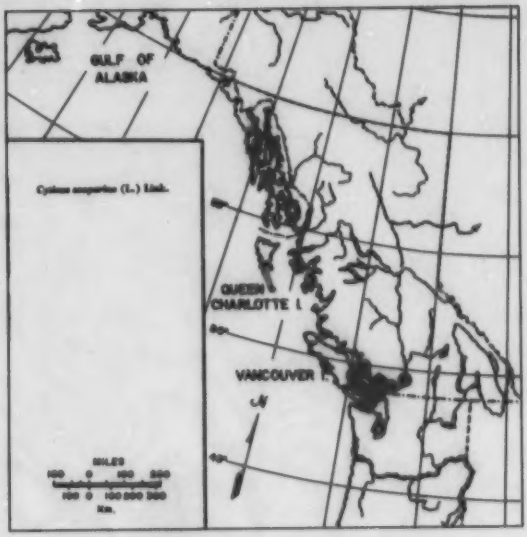
CYTISUS L. Broom

Unarmed shrubs with small leaves. Stems slender, wand-like, angled, green. Leaves alternate, mostly 1- to 3-foliate; leaflets frequently obovate, readily deciduous; stipules very small, somewhat thickened. Flowers axillary, papilionaceous, yellow, rarely white or other-coloured. Calyx herbaceous, tubular to campanulate, 2-lipped, upper lip 3-, lower 2-toothed. Standard nearly orbicular, reflexed; wings elliptic; keel oblong. Stamens 10, monodelphous, usually 4 long and 6 short. Style long, spirally coiled; stigma capitate. Pods dehiscent with spiralling valves; seeds 2 to many with a wart-like strophiole.

A genus of about 50 species, mostly from the Mediterranean region.

***Cytisus scoparius* (L.) Link.**—Much branched, usually erect but sometimes prostrate shrub to 3 m tall. Twigs glabrous, slender, strict, 5-angled. Leaves deciduous, petiolate; lower leaflets 3-foliate, upper simple, obovate to oblong-lanceolate, acute, pubescent when young, later glabrate; stipules lacking. Flowers about

Scotch broom (*Cytisus scoparius*).



20 mm long, yellow, purple, or brownish-tinged, solitary or paired in upper axils forming long, terminal racemes. Calyx glabrous, about one-quarter the length of the corolla. Style spirally coiled, longer than the keel. Pods about 4 cm long, black with some hairs on the margin (*Sarothamnus scoparius* (L.) Wimmer).

Sandy soils, markedly calcifuge; Europe; extensively naturalized, British Columbia to California west of the Coast Mountains. Southern Vancouver Island, the adjacent Gulf Islands, and Mainland.

GLYCYRRHIZA L. Licorice-root

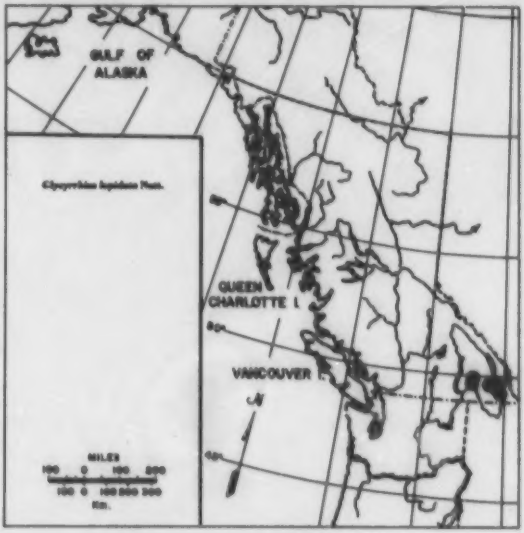
Glandular-dotted perennial herbs with widespreading, aromatic rootstocks. Leaves compound, odd-pinnate; stipules small, deciduous. Flowers in dense, axillary spikes, white, yellowish, or bluish, papilionaceous. Calyx bilabiate, tubular, oblique, the two upper lobes partly united, shorter than the lower. Banner oblong-

ovate, tapering to the base; wings and keel shorter, wings narrow, keel oblong, acuminate. Stamens 10, diadelphous, filaments coherent for about half their length. Ovary cylindrical, covered with hooked bristles. Pods bur-like, 1-celled, few seeded, scarcely dehiscent.

About 18 species widely distributed in temperate and subtropical regions. The licorice of commerce is obtained from *G. glabra* L.

Glycyrrhiza lepidota **Pursh**—Perennial from woody rhizome. Stems up to 1 m tall, erect, younger parts and the lower side of the leaves viscid with stalked or sessile glands. Leaflets 9–17, oblong-lanceolate, mucronate, those of the principal leaves 3–5 cm long, the others shorter and narrower. Racemes erect, dense, shorter than the leaves; flowers numerous, white or pale yellow, about 14 mm long. Calyx about half as long as the corolla, teeth subulate. Pods about 15 mm long, bearing hooked prickles.

Low ground and waste places; southern British Columbia to California, east to Ontario, Minnesota, Arkansas, and Texas. Found only in the Kootenay Valley.



Licorice-root (*Glycyrrhiza lepidota*).

HEDYSARUM Hedysarum

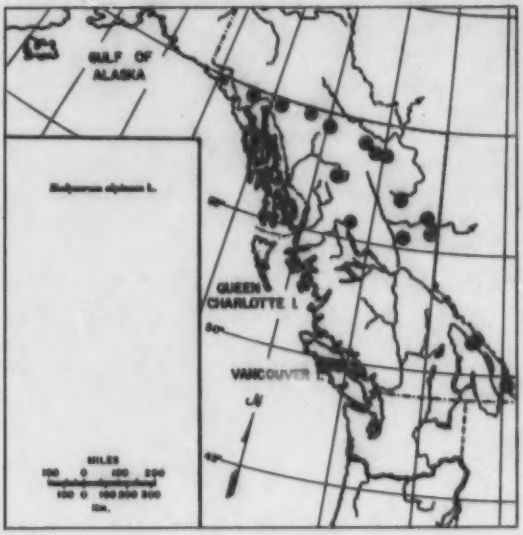
Herbaceous perennials with woody taproots. Stems several to numerous, decumbent to erect, longitudinally grooved, usually appressed pubescent, often densely so. Leaves odd-pinnate, petiolate; leaflets subsessile, commonly apiculate, mostly puncticulate above; stipules connate or free, membraneous. Inflorescence racemose, axillary, pedunculate. Flowers erect to reflexed, yellowish-white to pink or purple. Calyx bracteolate, campanulate, 5-toothed, pubescent. Corolla papilionaceous, glabrous; standard and the wings shorter than the keel. Stamens diadelphous. Fruit a loment with elliptic to suborbicular segments, segments, glabrous or pubescent, 1-seeded, areolate, wing-margined or not.

About 100 species, mostly of North Temperate regions.

ROLLINS, R. C. Studies in the genus *Hedysarum* in North America. Rhodora **42**:217–239. 1940.

1. Auricles of wings united, linear, more or less equalling the claw; calyx teeth markedly unequal, the upper nearly triangular; segments of loment wing-margined, areolæ about as broad as long; leaflets conspicuously veined.
   Flowers yellowish to white; segments of loment more than 6 mm broad; conspicuously wing-margined; leaflets mostly ovate to ovate-lanceolate, usually more than 6 mm wide ..... *H. sulphurescens*
   Flowers pink to purple; segments of loment narrowly wing-margined; leaflets mostly oblong to narrowly oblong, commonly less than 7 mm wide ..... *H. alpinus*
1. Auricles of wings not united, blunt, much shorter than the claw; calyx-teeth nearly equal, linear-subulate; segments of loment wingless, areolæ transversely elongated; veins of leaflets inconspicuous ..... *H. boreale*

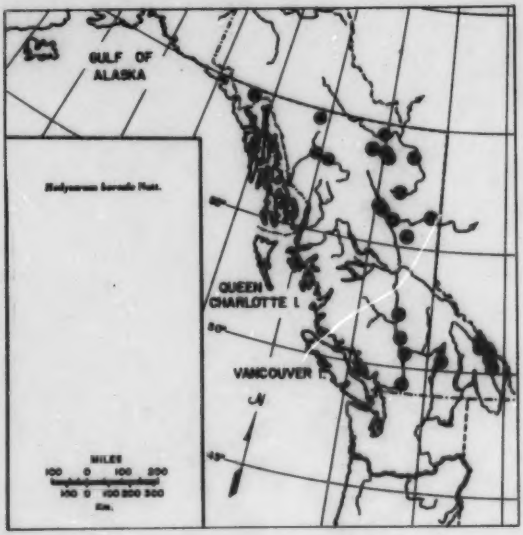
1. ***Hedysarum alpinum*** L.—Stems numerous, branched above, up to 7 dm tall, sparsely appressed-pubescent. Leaves petiolate, 6–15 mm long; leaflets 15–21, glabrous and obscurely punctate above, sparsely pubescent below, prominently veined, broadly lanceolate to oblong, usually obtuse, apiculate, 10–25 mm long, 4–7 mm wide; stipules connate, brown, the lower large and obtuse, the upper acute. Inflorescence elongated, often more or less secund. Flowers reddish-purple, 12–18 mm long, deflexed. Calyx pubescent; teeth unequal, shorter than the tube, the upper short and tri-



angular, the lower narrower and longer, standard obovate, emarginate, wings narrowly oblong to linear, blunt, wing auricles linear, united beneath the banner, equalling the claw. Loments pendent, glabrous to appressed-pubescent; segments slightly longer than broad, areolæ mostly polygonal, about as long as broad.

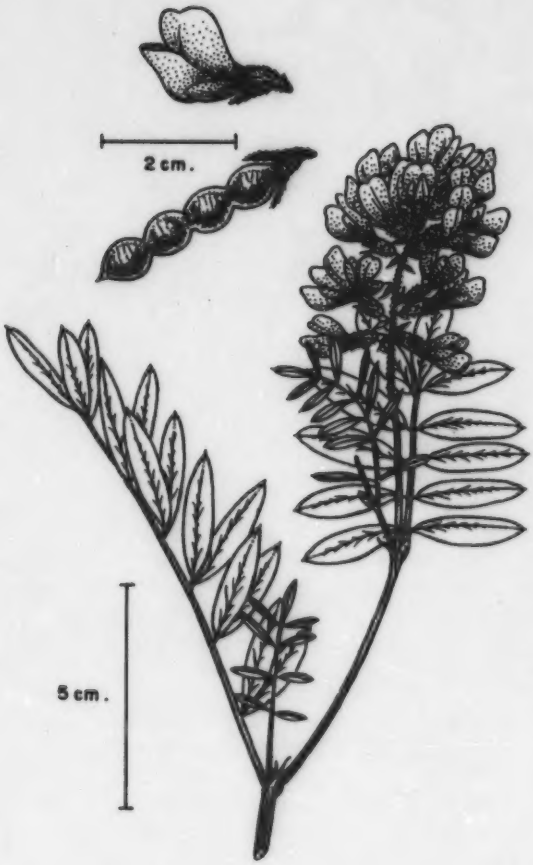
Grasslands and open woods; more or less circumboreal. General throughout the Province.

Alpine hedysarum (*Hedysarum alpinum*).

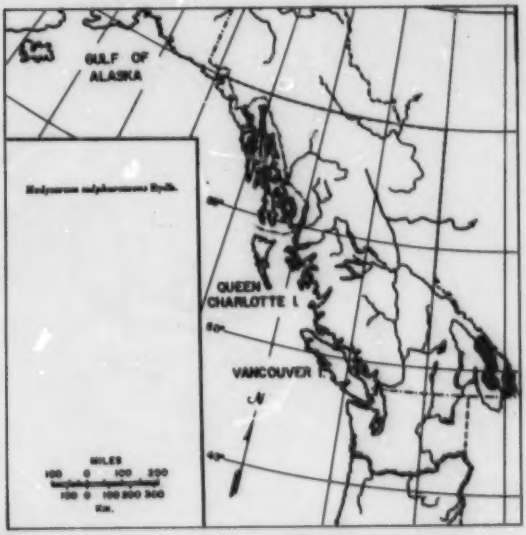


2. *Hedysarum boreale* Nutt.—Stems several to many, 2.5–6 dm tall, pubescent, branched above. Leaves short-petiolate, 4–8 cm long; leaflets 9–13, linear-oblong to elliptic, those of the lower leaves obovate, densely pubescent on both sides to glabrous above, punctate above, 3–8 mm wide, 1–2.5 cm long, obtuse; stipules brown, membraneous, triangular with subulate tip, the lower connate, the upper more or less free. Inflorescence elongate. Flowers carmine, 12–19 mm long, numerous, erect. Calyx pubescent; teeth more or less equal, subulate, longer than the tube. Standard obovate, emarginate, 12–17 mm long; wings 10–14 mm long, 2.5–4 mm wide, claw broad, wing-auricles free, blunt, shorter than the claw. Loments pendent to more or less divaricate; segments suborbicular, slightly longer than broad, appressed-pubescent, not wing-margined, areolæ transversely elongated (*H. mackenzii* Richard.).

Dry hillsides; Yukon to Newfoundland, south to British Columbia, Idaho, Arizona, New Mexico, Wyoming, South Dakota, and Manitoba. General throughout the Interior.



Northern hedysarum (*Hedysarum boreale*).



3. *Hedysarum sulphurescens* Rydb.—Stems several to many from a woody rootstock, shallowly furrowed longitudinally, branched above, appressed-pubescent, 2–6 dm tall. Leaves 8–12 cm long, petiolate; leaflets 9–17, elliptic to ovate-oblong, usually apiculate, conspicuously veined, sparsely pubescent below, punctate above, 15–30 mm long, 5–10 mm broad; stipules brown, membranous, connate, the lower obtuse, the upper acute and reduced. Inflorescence elongate. Flowers yellowish-white, 15–18 mm long, pendent. Calyx pubescent; teeth unequal, shorter than the tube, the upper shorter and broader than the lower. Standard obovate, cuneate, emarginate, 12–14 mm long; wings obtuse, 2.5–3 mm wide, wing-auricles linear, united under the standard equalling the claw; keel sharply truncate. Loments pendent; segments conspicuously wing-margined, glabrous, asymmetrically elliptical, longer than broad, areolæ polygonal.

Open forest, east of the Coast Mountains; British Columbia and Alberta, south to eastern Washington, Montana, and Wyoming. Known only in the Columbia Valley from Golden south.

Yellow hedysarum (*Hedysarum sulphurescens*).

LATHYRUS L. Peavine, Sweet-pea

Annuals or perennials with rootstocks or sometimes strong taproots. Stems erect to twining, angled to distinctly winged. Leaves pinnately compound; leaflets few (or lacking) to many; stipules hastate to obliquely sagittate-lobed; tendrils usually well developed but sometimes reduced to a simple bristle. Flowers papilionaceous, single or racemose; peduncle axillary, often bracteolate. Calyx obliquely campanulate. Standard usually differentiated into a blade and claw, the blade reflexed at about right angles to the wings and keel. Stamens diadelphous. Style usually reflexed upward from the ovary to near a right angle, flattened and hairy on the ventral surface for approximately half its length, persistent. Legumes 1-celled, several seeded.

About 150 species, predominantly of the North Temperate Zone.

BRADSHAW, R. V. Pacific Coast species, Lathyrus. Bot. Gaz. **80**: 233–261. 1925.

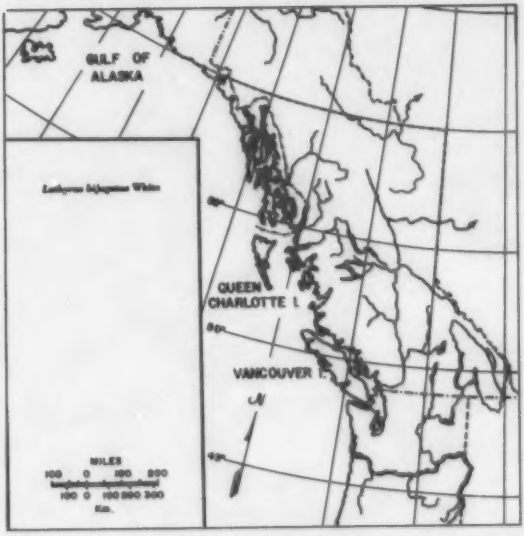
HITCHCOCK, C. L. A revision of the North American species of Lathyrus. U. Wash. Publ. Biol. **15**:1–104. 1952.

SENN, H. A. Experimental data for a revision of the genus Lathyrus. Amer. Journ. Bot. **25**:67–78. 1938.

1. Leaflets 2; annual or weedy perennials.
   2. Flowers yellow; 3–12 on a raceme, less than 17 mm long; perennial ..... *L. pratensis*
   2. Flowers usually not yellow, but, if so, then only 1–4 flowers on a raceme and more than 17 mm long or plants annual.
      3. Annual; flowers less than 15 mm long; peduncle 1-flowered ..... *L. sphæricus*
      3. Perennials.
         Pods more than 6 cm long, more than 17 mm broad; stipules more than 3 cm long, ovate to broadly lanceolate ..... *L. latifolius*
         Pods less than 6 cm long, less than 6 mm broad; stipules less than 3 cm long, linear-lanceolate ..... *L. sylvestris*

1. Leaflets at least 4 on some of the leaves; native perennials.
   4. Plants of coastal sand dunes.
      Plants greyish-villous; tendrils lacking ..... *L. littoralis*
      Plants greenish; tendrils well developed ..... *L. japonicus*

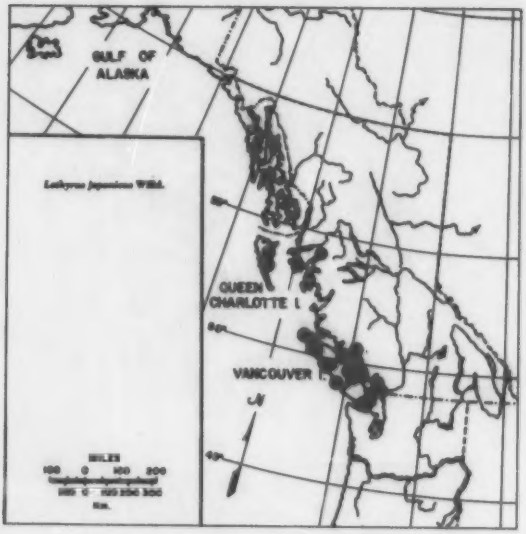
4. Plants seldom on coastal or lacustrine dunes, but, if so, stems winged and tendrils present or stipules not sagittate.
   5. Tendrils bristle-like, simple, not at all prehensile.
      Leaflets 2 or 4; flowers less than 14 mm long; pod less than 4 cm long ..... *L. bijugatus*
      Leaflets usually 6 or more; flowers at least 18 mm long; pod mostly over 5 cm long ..... *L. nevadensis*
   5. Tendrils prehensile on at least some of the leaves; simple or forked or pinnate.
      6. Stems winged; flowers mostly lavender to bluish-purple; stipules sagittate-ovate to narrowly lanceolate, usually constricted into 2 lobes ..... *L. palustris*
      6. Stems not winged.
         7. Lateral calyx teeth considerably broadened above their juncture with the tube, the lowest usually equal to or longer than the tube; flowers white ..... *L. ochroleucus*
         7. Lateral calyx teeth usually broadest at their juncture with the tube, little if at all flared above, the lowest often definitely shorter than the tube.
            8. Corolla white (standard pink- or lavender-veined) fading to yellow or tan ..... *L. nevadensis*
            8. Corolla bluish or red but often pale and fading to brown.
               Leaflets mostly 6; upper calyx-teeth broadly triangular-ovate, scarcely half as long as the lower lateral teeth; stems usually more or less winged; stipules sagittate-ovate to lanceolate, often dentate ..... *L. ochroleucus*
               Leaflets usually more than 6; upper calyx-teeth usually more than half as long as the laterals; stems wingless; stipules often linear and entire ..... *L. polyphyllus*



1. ***Lathyrus bijugatus*** **White.**—Perennial with slender rootstock. Stem up to 3 dm tall, slender, erect, not winged, glabrous to sparsely, crisp puberulent. Leaflets usually 2 or 4, as much as 15 cm long, linear to oblong-elliptic; rachis slightly winged margined; stipules less than ⅓ the length of the leaflets, 2-lobed, upper lobe linear-lanceolate, lower similar but about half as long; tendrils bristle-like, less than 3 mm long. Racemes 2- or 3-flowered; peduncles shorter than the subtending leaf, about as long as the rachis. Flowers up to 13 mm long, pink to blue. Calyx about 7 mm long, teeth narrowly lanceolate, upper 2 equalling or shorter than the lower 3, the lowest about equalling the tube. Standard broadly obcordate, about 13 mm long; wings about equalling the standard and somewhat longer than the keel. Pod about 3 cm long, glabrate.

Open woods; eastern Washington and adjacent Idaho. Not yet recorded from British Columbia but likely to occur in the southeastern Kootenay Valley.

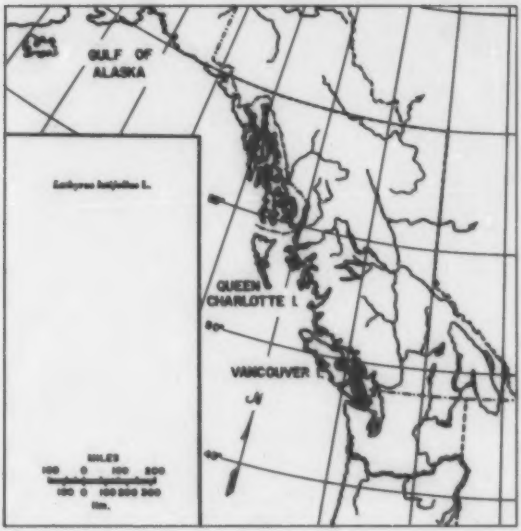
Pinewood peavine (*Lathyrus bijugatus*).



2. *Lathyrus japonicus* Willd.—Perennial. Stems to 1.5 m long, decumbent or clambering, angled but not winged, glabrous or sparsely pubescent on the rachis of the leaves. Leaflets 6–12, green, rather fleshy, strongly nerved when dry, up to 7 cm long; tendrils well developed; stipules obliquely hastate or sagittate-ovate, equalling or longer than the leaflets. Racemes loosely 2- to 8-flowered; peduncle considerly shorter than the leaves. Flowers up to 30 mm long, reddish-purple to light blue. Calyx about 13 mm long, teeth lanceolate, ciliate, the upper half as long as the lower laterals, all 3 lower teeth longer than the tube. Standard about 18 mm long; wings and keel somewhat shorter. Pod as much as 7 cm long, pubescent (*L. maritimus* (L.) Fries).

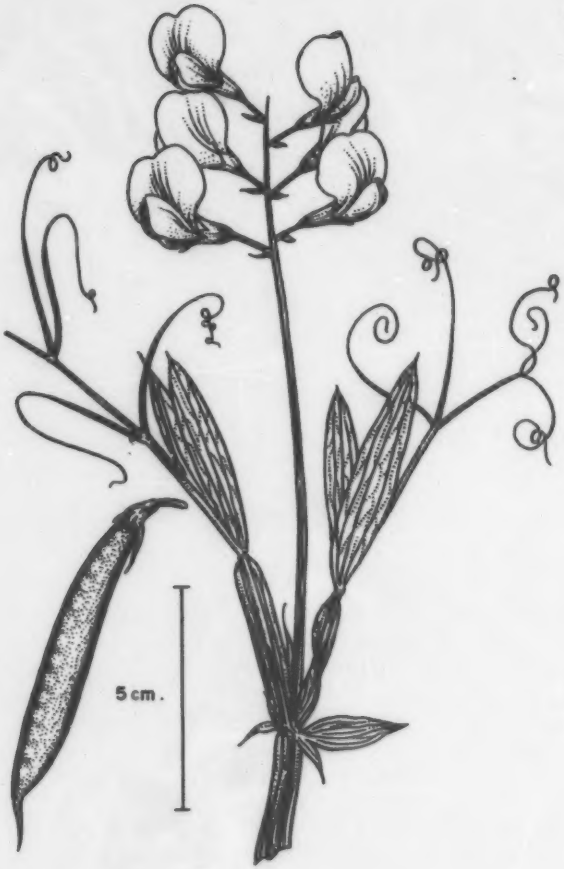
Coastal and lacustrine dunes; Alaska to northern California; Great Lakes, Atlantic Coast, Eurasia. Common along the Coast.

Seashore peavine (*Lathyrus japonicus*).

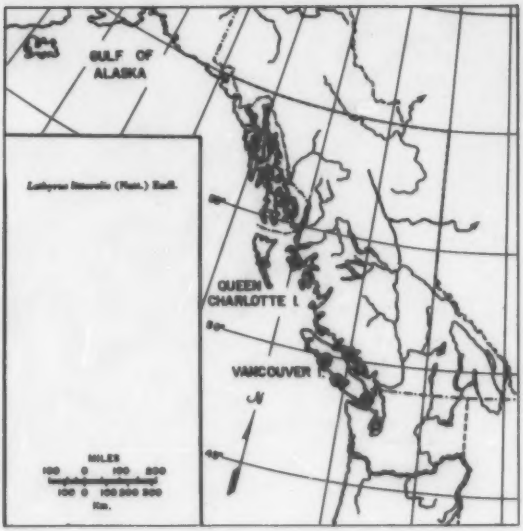


3. *Lathyrus latifolius* L.—Perennial with rootstock. Stems climbing, up to 20 dm long, glabrous, broadly winged. Leaflets 2, lance-elliptic to obovate-lanceolate, up to 15 cm long and 5 cm broad; tendrils well developed; stipules broadly lanceolate to ovate, up to 5 cm long, usually entire, 2-lobed with upper lobe 2–3 times as long as the lower. Racemes 5- to 15-flowered; penduncle often greatly exceeding the leaves. Flowers about 18 mm long, commonly pinkish-red. Calyx up to 12 mm long; teeth triangular-lanceolate, equalling or longer than the tube. Standard well reflexed, nearly as broad as long; wings considerably shorter than the standard but longer than the keel. Pods up to 10 cm long.

Roadside weed, escaped from cultivation; Europe. Established in a number of places on Vancouver Island.

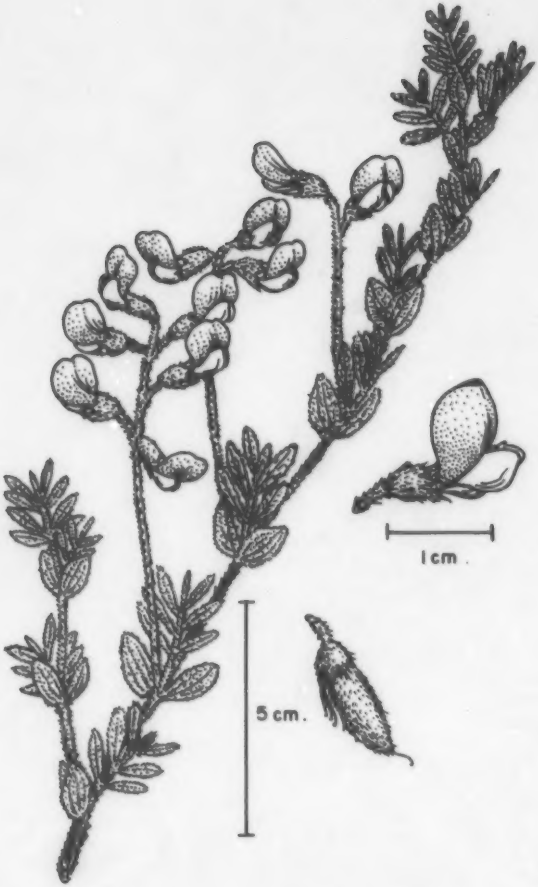


Perennial peavine (*Lathyrus latifolius*).

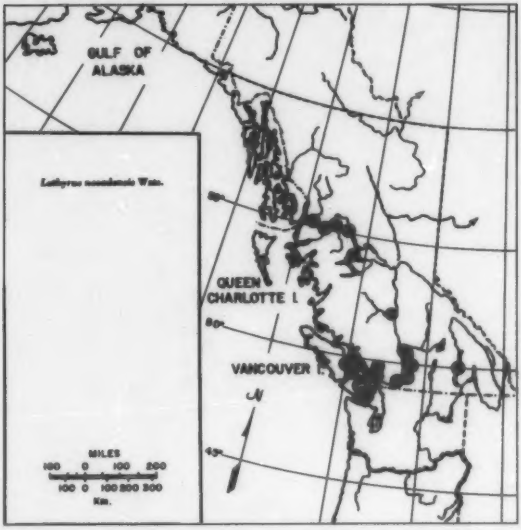


4. *Lathyrus littoralis* (Nutt.) Endl.—Perennial with wide-spreading rootstock. Stems up to 6 dm long, prostrate or erect, grey-villous. Leaflets 4–8, oblong-lanceolate, 1–2 cm long; rachis longer, prolonged as a leaf-like bristle; tendrils lacking; stipules obliquely ovate or ovate-hastate to lanceolate, sometimes 2-lobed, usually as long as the leaflets. Racemes loosely 2- to 6-flowered; peduncles usually several times the length of the leaves. Flowers 12–18 mm long, white to pink or purple. Calyx about 9 mm long; teeth lanceolate, subequal and about equalling the tube. Standard longer than the wings, wings and keel usually white, wings slightly longer than the keel. Pods about 3 cm long, grey-villous.

Coastal dunes and sand beaches: Vancouver Island to California. Known only from southern Vancouver Island.

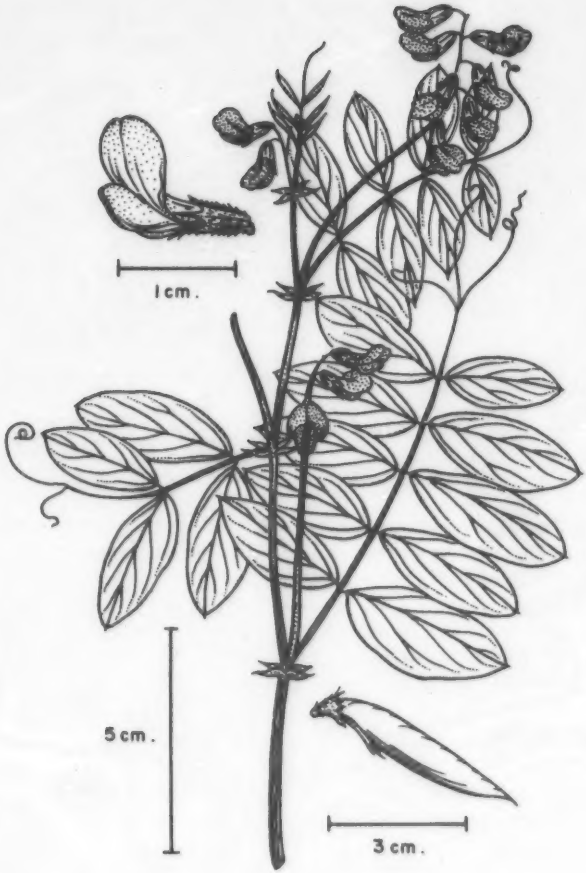


Beach peavine (*Lathyrus littoralis*).

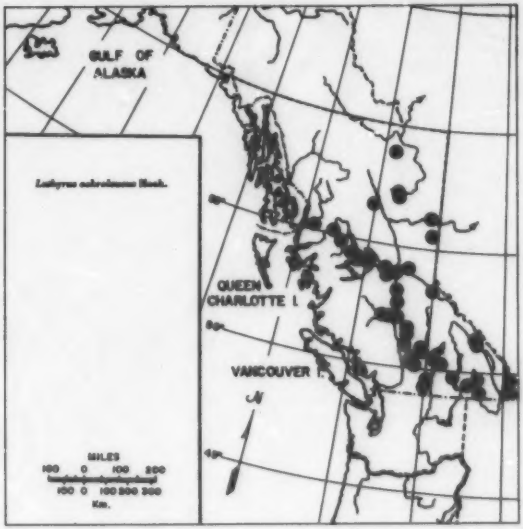


5. *Lathyrus nevadensis* Wats.—Perennial with a creeping rootstock. Stems erect to clambering, up to 8 dm long, angled but not winged. Leaflets 4–10, linear to ovate-lanceolate or lance-elliptic, 2–12 cm long, sparsely to more or less densely soft pubescent on the lower surface; tendrils present and usually branched; stipules lanceolate to linear-lanceolate, 2-lobed, the whole less than half the length of the leaflets. Raceme loosely 2- to 7-flowered; peduncle either longer or shorter than the leaves. Flowers mostly bluish-purple or mauve-red, fading to tan, standard darker than wings or keel. Calyx up to 12 mm long, more or less hairy or at least ciliate; teeth lanceolate or linear-lanceolate, subequal, about half the length of tube. Standard 15–27 mm long, considerably reflexed; wings about equal in length to the standard; keel shorter than the wings. Pod up to 7 cm long, glabrous (*L. nuttallii* Wats.).

Open woods; British Columbia to California, east to Idaho. General south from about Lat. 55°N.

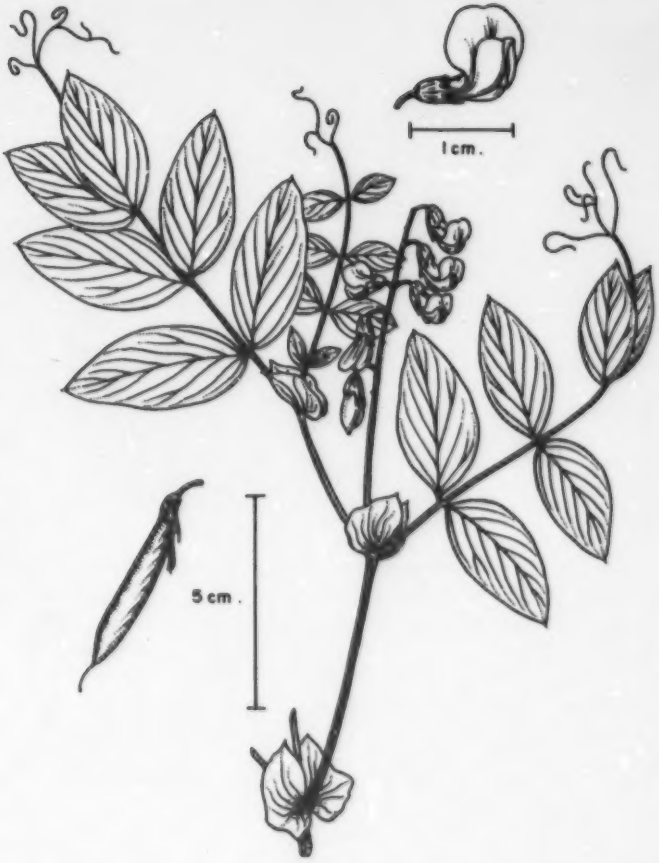


Sierran peavine (*Lathyrus nevadensis*).

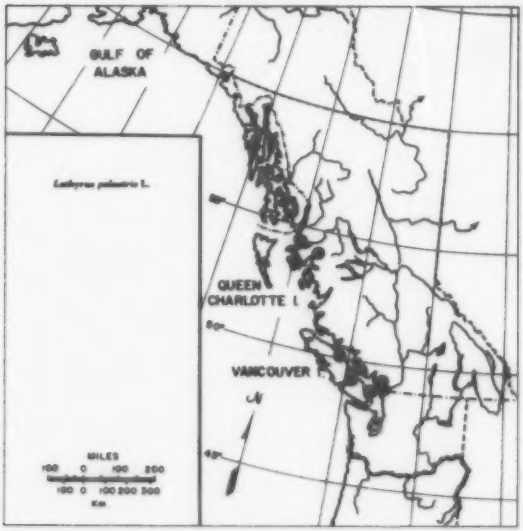


6. *Lathyrus ochroleucus* Hook.—Perennial with rootstock. Stems erect to 8 dm glabrous wingless but more or less angled. Leaflets mostly 6, ovate to lance-elliptic, up to 7 cm long; tendrils well developed, usually branched, prehensile; stipules ovate to ovate-lanceolate, not contracted into 2 lobes. Racemes 6- to 15-flowered; peduncles shorter than the leaves. Flowers white to yellowish-white. Calyx about 9 mm long, glabrous except for cilia on the teeth; upper teeth deltoid-ovate about half as long as the oblong-lanceolate to narrowly ovate-oblong lower teeth which about equal the tube. Standard up to 17 mm long, well reflexed; wings and keel about equal but shorter than the standard. Pod up to 7 cm long, glabrous.

Open woods and rocky slopes; Mackenzie District, Northwest Territories to Quebec, south to northeastern Washington, Idaho, Montana, north central states to central Pennsylvania. General in the eastern half of British Columbia.

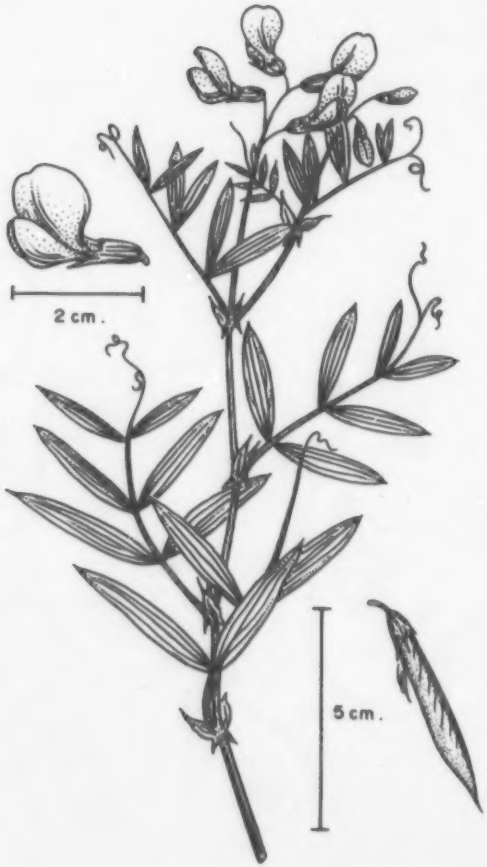


Cream-flowered peavine (*Lathyrus ochroleucus*).

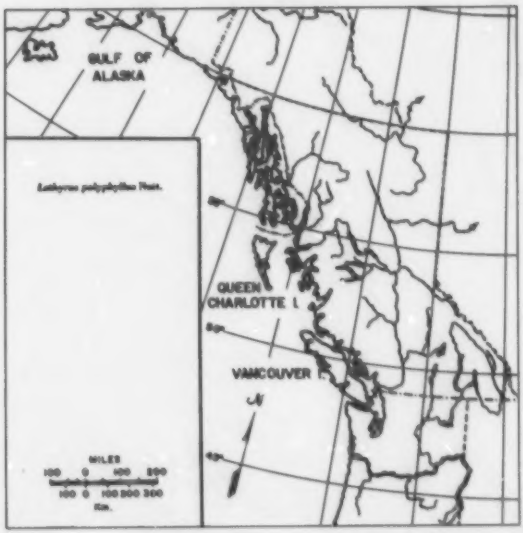


7. ***Lathyrus palustris*** **L.**—Perennial. Stems to 10 dm long, scandent, narrowly winged or sometimes essentially wingless; herbage glabrous to pubescent. Leaflets usually 6, as much as 7 cm long, linear to ovate, commonly elliptic-lanceolate; tendrils well developed; stipules sagittate-ovate to narrowly lanceolate, 2-lobed, margins usually dentate, half the length of leaflets or less. Raceme 2- to 5-flowered; peduncles from as long as to considerably shorter than the leaves. Flowers pink to bluish-purple. Calyx about 10 mm long, glabrous to uniformly hairy; upper teeth broadly triangular-oblong, about half the length of the lanceolate lower laterals. Standard up to 22 mm long; wings and keel about equalling the standard. Pod about 5 cm long, strigillose.

Coastal mudflats; Alaska to California; Great Lakes region; Quebec to North Carolina; Eurasia. Found only on the Coast.



Marsh peavine (*Lathyrus palustris*).



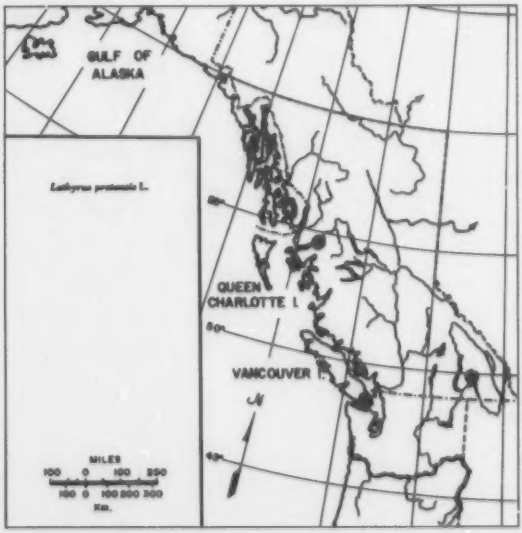
8. *Lathyrus polyphyllus* Nutt.—Perennial. Herbage glabrous or essentially so. Stem up to 10 dm long, erect to more or less scrambling, terete or angled but not at all winged. Leaves mostly lacking from the stem by anthesis; leaflets 10–16, scattered rather than paired, about 5 cm long, rarely as much as 1 cm broad, ovate-lanceolate to lance-elliptic; tendrils present, often unbranched, scarcely prehensile; stipules sagittate-ovate, more than half the length of the leaflets, not constricted into 2 lobes, margins erose-dentate. Raceme loosely 5- to 13-flowered, secund; peduncle about equal to the raceme and about half the length of leaves. Flowers bluish-purple. Calyx often purple-tinged, 7–13 mm long, glabrous except for the ciliate teeth; upper teeth deltoid to lanceolate, about half the length of the linear-lanceolate lower laterals which are shorter than the lowest tooth. Standard more reddish on back, not markedly reflexed, wings lighter coloured, even white, shorter than the standard; keel lighter and considerably shorter than the wings. Pod up to 7 cm long, glabrous.

Leafy peavine (*Lathyrus polyphyllus*).

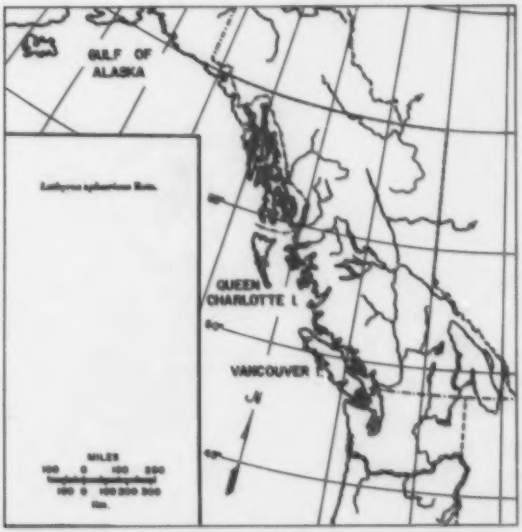
Coastal mountains and grasslands; northern Washington to northern California. Not yet collected in British Columbia but likely to occur on Vancouver Island.

9. *Lathyrus pratensis* L.—Perennial. Stem to 10 dm long, decumbent to erect, wingless, usually freely branched, subglabrous or more commonly rather densely villous-hirsute. Leaflets 2, as much as 5 cm long, narrowly linear-elliptic; tendrils well developed; stipules lanceolate to ovate-lanceolate, entire, often equal to the leaflets. Raceme closely 3- to 13-flowered; peduncle usually longer than the leaves. Flowers yellow. Calyx about 7 mm long; teeth linear-lanceolate, slightly shorter than the tube. Standard reflexed; wings clearly shorter than the standard and slightly longer than the keel. Pod about 2.5 cm long, finely pubescent or subglabrous, compressed.

Grassy places, edge of woods; Europe. Garden escape, locally established in a few places.

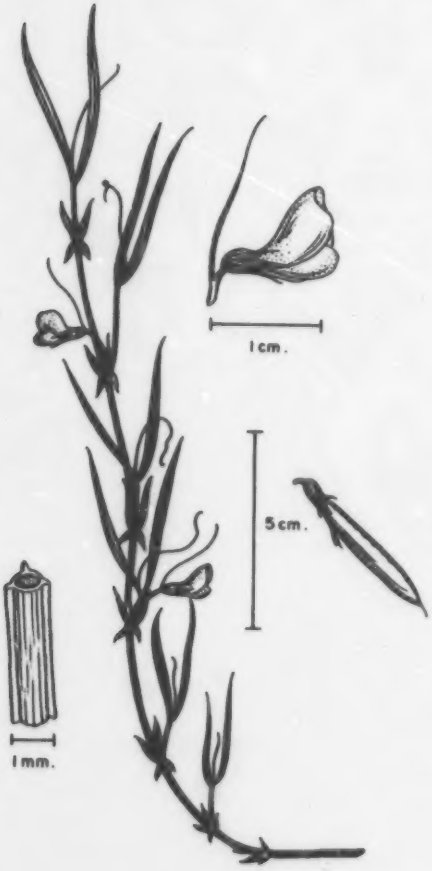


Meadow peavine (*Lathyrus pratensis*).

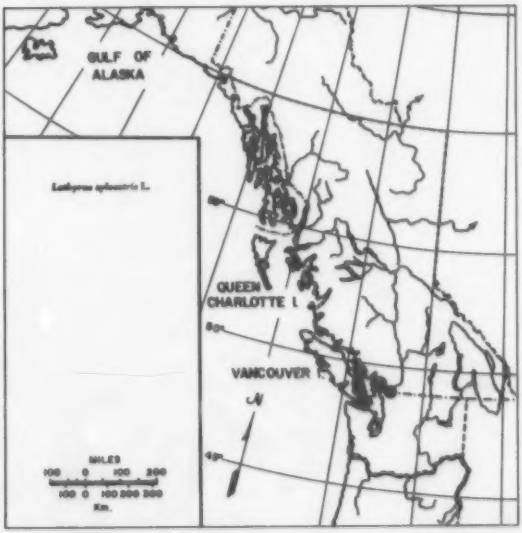


10. *Lathyrus sphaericus* Retz.—Annual. Stems several, slender, erect to 5 dm narrowly winged or wingless, glabrous. Leaflets 2, up to 6 cm long, linear to narrowly elliptic; lower leaves with only a bristle, upper with well-developed tendril; stipules linear to linear-lanceolate, 2-lobed, the upper twice as long as the lower, the whole about one-quarter the length of a leaflet. Peduncle 1-flowered, but rachis extending as a bristle or tendril. Flowers bluish. Calyx about 7 mm long, teeth linear-lanceolate, usually longer than the tube. Standard about 1 cm long, moderately reflexed. Pod up to 6 cm long, glabrous.

Eurasia; reported by Boivin from British Columbia.



Grass peavine (*Lathyrus sphæricus*).



12. ***Lathyrus sylvestris*** **L.** — Perennial from a rootstock. Herbage glabrous. Stems up to 2 mm long, climbing, broadly winged. Leaflets 2, as much as 12 cm long, lanceolate to elliptic-lanceolate; tendrils well developed, branched; stipules up to 2 cm long, linear-lanceolate, 2-lobed, basal lobe spreading, less than half width of stem. Raceme 4- to 9-flowered; peduncles often much exceeding the leaflets. Flowers rose-pink. Calyx about 8 mm long, teeth lance-triangular, shorter than the tube. Standard about 15 mm long, reflexed. Pods about 6 cm long, compressed, narrowly winged along upper suture, glabrous.

Woods and thickets; Eurasia. Escaped from cultivation in a few localities, on southern Vancouver Island and the Lower Mainland.

Flat peavine (*Lathyrus sylvestris*).

LOTUS L. Deervetch, Birdsfoot-trefoil, Lotus

Annuals or perennials with spreading or erect, solid, or hollow stems. Leaves pinnately compound, rarely subpalmate; leaflets 1 to many, entire-margined; stipules foliaceous, membranous, or gland-like. Flowers papilionaceous, axillary and sessile to pedunculate 1- to many-flowered umbels, mostly leafy bracteate. Calyx cylindrical with more or less equal teeth. Corolla whitish to yellow, often tinged or streaked with red, rose, or purple; wings obovate or oblong; keel incurved, beaked or obtuse. Stamens 10, diadelphous. Legumes straight to strongly arcuate; seeds 1 to many.

A genus of about 150 species, chiefly in temperate regions.

OTTLEY, ALICE M. A revision of the Californian Species of Lotus. U. Calif. Publ. Bot **10**:189–305. 1923.

CALLEN, E. O. Studies in the genus Lotus (Leguminosæ). 1. Limits and subdivisions of the genus. Can. Jour. Bot. **37**: 157–165. 1959.

BOIVIN, B. Centurie de plants canadiennes III. Nat. Can. **87**: 37–38. 1960.

1. Plants annual; stipules reduced to blackish glands; flowers 1–3, sessile or short peduncled in leaf axils.
   2. Flowers subsessile; rachis of leaves flattened; pods less than 15 mm long, not constricted between the seeds ..... *L. denticulatus*
   2. Flowers peduncled; rachis of leaves not flattened; pods usually considerably more than 15 mm long, often constricted between seeds.
      Leaflets mostly 3; calyx-teeth considerably longer than the tube; pods only slightly or not at all constricted between seeds..... *L. purshianus*
      Leaflets mostly 5; calyx-teeth considerably shorter than the tube; pods usually markedly constricted between seeds..... *L. micranthus*
1. Plants perennial; stipules often well developed; flowers in axillary, pedunculate umbels, usually at least 3 per umbel.
   3. Leaves apparently sessile; leaflets 5, lowest pair basal, petiolate, similar to the other 3; true stipules represented by small dark glands.
      4. Leaflets of upper leaves linear or linear-lanceolate, about 4 times as long as wide; flowers about 10 mm long ..... *L. tenuis*
      4. Leaflets of upper leaves lanceolate to obovate, usually not more than 3 times as long as wide; flowers usually at least 15 mm long.

Leaflets generally less than 10 mm long, basal (stipule-like) pair ovate to lanceolate; umbel 2- to 6-flowered; calyx lobes about 1.5 mm long, much shorter than the tube, not, or only shortly, ciliate ..... *L. corniculatus*

Leaflets generally more than 15 mm long, basal (stipule-like) pair broadly ovate; umbels 8- to 25-flowered; calyx lobes at least 2.5 mm long, longer than the tube, rarely not but mostly ciliate with long hairs ..... *L. pedunculatus*

3. Leaves petiolate; leaflets 3–15, lowest pair not basal on petiole; stipules gland-like, if foliaceous, then dissimilar to the leaflets.

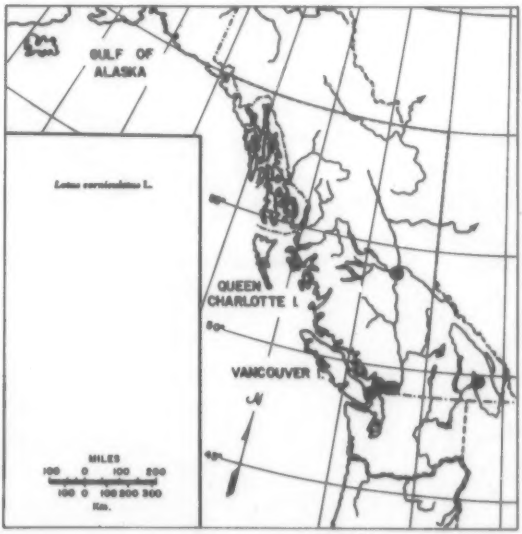
5. Stipules gland-like, dark; leaflets usually 5; pods falcate, indehiscent, 1- to 3-seeded ..... *L. nevadensis*

5. Stipules membranous not gland-like or leaf-like; leaflets 5–15; pods elongate, almost or quite straight, dehiscent, 5- to 25-seeded.

Bracts usually 3-foliate; standard yellow, wings pink to rose, keel purplish-tipped ..... *L. formosissimus*

Bracts absent or usually a mere tooth, rarely a single leaflet; all petals cream to yellowish with little if any pink..... *L. pinnatus*

1. *Lotus corniculatus* L.—Perennial from a stout rootstock, scarcely stoloniferous. Stem solid, decumbent, up to 4 cm long,



Birdsfoot-trefoil (*Lotus corniculatus*).

glabrous or pubescent. Leaflets 5, about 10 mm long, obovate, obtuse or apiculate, minutely serrulate, the basal stipule-like pair, ovate to lanceolate. Umbels 2- to 6-flowered; peduncles stout, as much as 8 cm long; bract 3-foliolate. Flowers about 15 mm long, yellow-streaked or tipped with red, 2–3 times as long as the calyx. Calyx glabrous or pubescent, teeth narrowly triangular-lanceolate, erect in body, 2 upper with obtuse sinus, much shorter than the tube, not or shortly ciliate. Pods about 3 cm long.

Pastures and grassy places; Eurasia, North Africa. Adventive and established locally, mostly on the Coast.

2. ***Lotus denticulatus*** **Greene**—Annual. Stems erect, up to 5 dm tall; branches few, coarse, glabrous or pubescent with short appressed hairs. Leaves pilose; leaflets 3 or 4, narrowly obovate, margins usually denticulate; rachis flattened, with 2 leaflets at top and 1 or 2 on one side. Flowers solitary, almost sessile, about 7 mm long. Calyx teeth nearly twice as long as the tube, pubescent with soft, appressed hairs. Petals whitish-cream with back of the

Meadow lotus (*Lotus denticulatus*).

F-2

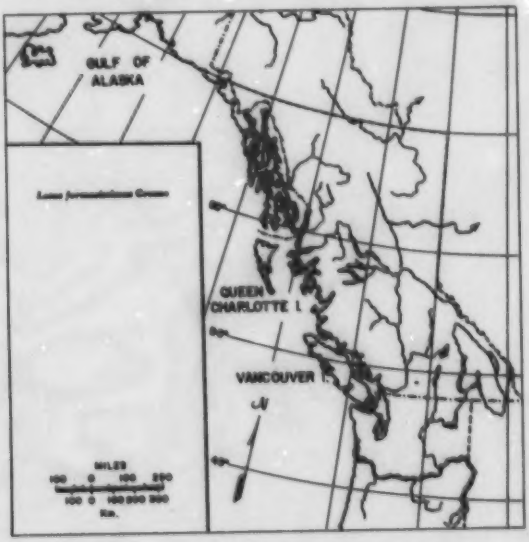
Seaside lotus (*Lotus formosissimus*).

standard tinged with purple. Pod about 15 mm long, not constricted between the seeds, short appressed pubescent.

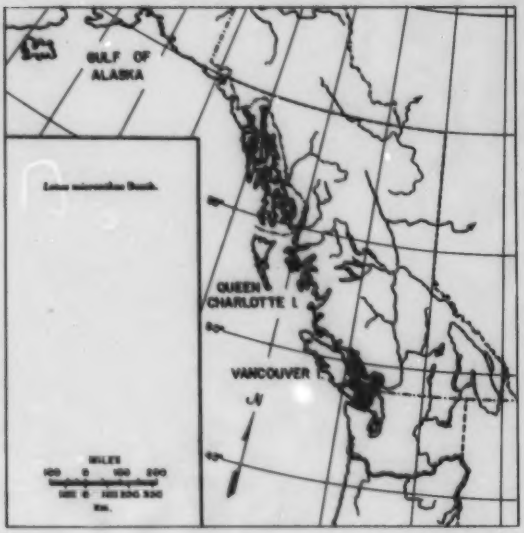
Sandy soil in the open; southern British Columbia to northern California. Common in the southern Interior, rarer on the Coast.

3. *Lotus formosissimus* Greene — Perennial. Stems glabrous, erect or decumbent to 5 dm long. Leaflets mostly 5, ovate to oblanceolate, those of the lower leaves obovate, obtuse; stipules ovate, up to 15 mm long. Umbels 1- to 5-flowered; bract commonly 3-foliolate. Calyx teeth shorter than the tube. Wings pale lilac to rose, drying darker, keel deep purple. Pod about 2.5 cm long.

Moist situations; southwestern British Columbia to central California, west of Cascades. Known only in the vicinity of Victoria.



4. *Lotus micranthus* Benth.—Annual. Stem slender, diffuse, up to 3 dm long, more or less glabrous. Leaflets 3–5, often glaucous, oblong to elliptic, obtuse; stipules gland-like. Flowers solitary; bract 3-foliolate. Calyx teeth subulate, as long as or



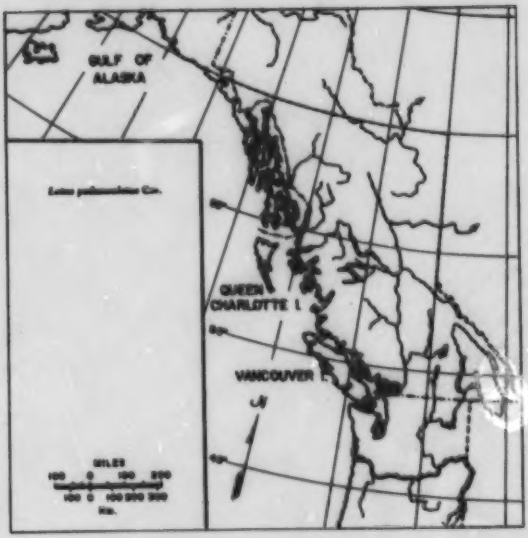
shorter than the tube. Petals about 5 mm long, yellow often with reddish tinge. Pods about 2 cm long, constricted between the seeds; seeds 5–9.

Grassy places; British Columbia to California, west of Cascades. Limited to Vancouver Island and the Gulf Islands.

5. ***Lotus nevadensis*** **(Wats.) Greene**—Perennial with long decumbent hirsute-strigose to villous, commonly greyish branches up to 5 dm long. Leaflets usually 5, oblanceolate or obovate, acute; stipules dark, gland-like. Umbels 3- to 12-flowered, peduncles arising at intervals along the stems; bract commonly 3-foliate. Calyx teeth linear-subulate, about equalling the tube. Petals up to 11 mm long, yellow, but often orange or reddish-tinged, wings longer than the keel. Pods arcuate, about twice as long as the calyx (not illustrated).

Rocky and sandy soil; southwestern British Columbia to California, east to Idaho and Nevada. Reported by Hitchcock.

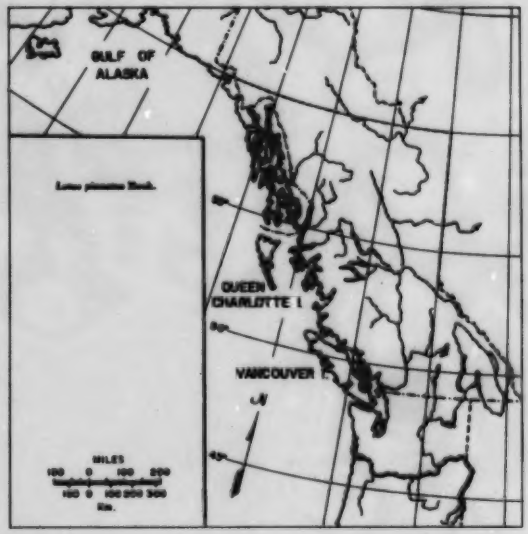
Small-flowered lotus (*Lotus micranthus*).



6. ***Lotus pedunculatus*** Cav.—Perennial from slender rootstock with numerous stolons. Stems erect or ascending to 6 dm glabrous or pubescent, hollow. Leaflets 5, 15–20 mm long, obovate, obtuse or mucronate, basal pair stipule-like, broadly ovate. Umbels 7- to 12-flowered; peduncles about 15 cm long; bracts 3-foliolate. Calyx about 7 mm long, teeth narrowly triangular-lanceolate, somewhat longer than the tube, rarely without cilia but mostly ciliate with long hairs. Petals yellow, about twice as long as the calyx. Pods about 2.5 cm long, glabrous, not constricted between the seeds, long bristle-like style persistent in young fruit (*L. uliginosus* Schkuhr).

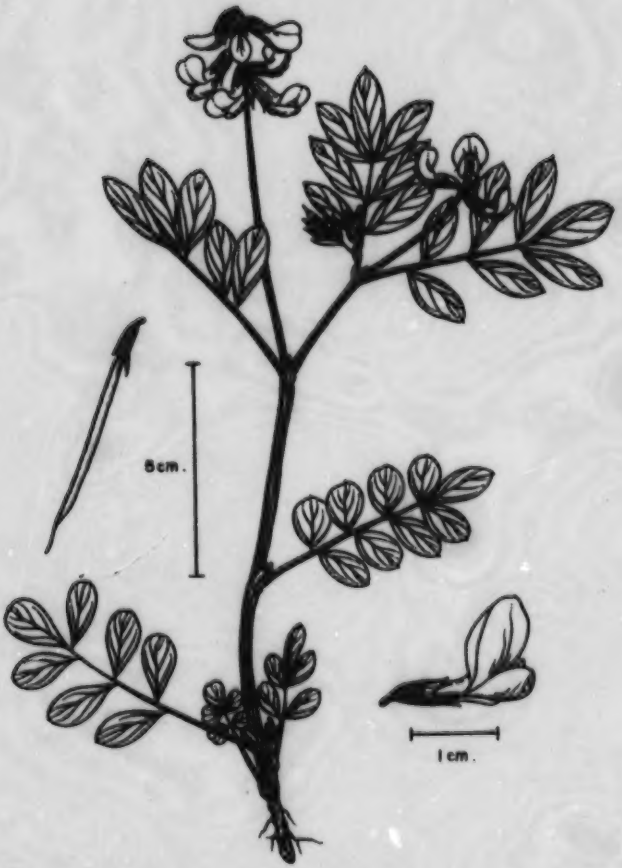
Damp grassy places; Eurasia, North Africa. Adventive, mostly in the lower Fraser Valley.

Pedunculate lotus (*Lotus pedunculatus*).

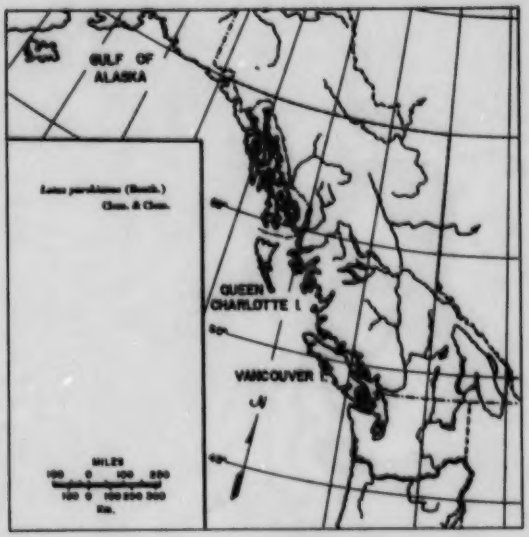


7. *Lotus pinnatus* Hook.—Perennial with a thick rootstock. Stems erect, up to 4 dm tall, glabrous. Leaflets 5–9, oval or obovate, more or less mucronulate; stipules membranous, narrowly ovate. Umbels 3- to 7-flowered, bractless or with single scarious bractlet. Calyx tube about 6 mm long, bilabiate, 2 upper teeth short triangular, 3 lower long subulate, teeth much shorter than the tube. Petals about 15 mm long, standard and keel yellow, wings creamy. Pods to 6 cm long, seeds as many as 20.

Stream banks and wet places; southern British Columbia to California, east to Idaho. Known only from Nanaimo region.



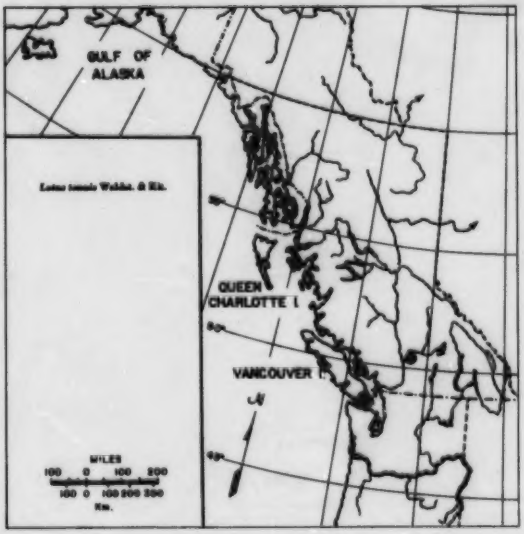
Meadow deervetch (*Lotus pinnatus*).



8. *Lotus purshianus* (Benth.) Clem. & Clem.—Perennial. Stems erect or ascending to 4 dm, well branched, herbage pilose to glabrous. Leaflets typically 3, but 4 or 5 on vigorous branches, sometimes only 1, terminal leaflet oblong or elliptic, acute, petiolate, 2 lateral asymmetrically ovate, sessile, attached to base of leaf. Flowers solitary; peduncles usually exceeding the leaves; bract 1-foliolate. Calyx teeth narrowly triangular-subulate, nearly equal, up to twice the length of the tube. Corolla creamy to white, standard deeply veined with rose, keel tipped with yellow, longer than the wings. Pod not more than 3.5 cm long, glabrous, linear; seeds 3–7 (*L. americanus* (Nutt.) Bisch.).

Open sandy and rocky woods; southern British Columbia to Mexico, east to Manitoba, Arkansas, and Texas. Known only at Cowichan Lake.

Spanish-clover (*Lotus purshianus*).



9. *Lotus tenuis* Waldst. & Kit.—Stems up to 90 cm. long, glabrous or sparsely pubescent, rather freely branched. Leaflets 5–15 by 1–4 mm linear or linear-lanceolate. Heads not more than 4-flowered; peduncles slender. Calyx teeth about equal, often subulate, usually shorter than the tube. Corolla not more than 12 mm long, yellow; wings obovate-oblong. Pod up to 30 mm long.

Dry, grassy places. Europe. Naturalized on southern Vancouver Island and near Lytton.

Slender birdsfoot-trefoil (*Lotus tenuis*).

LUPINUS L. Lupine

Annual or perennial herbs. Stems solitary or in clumps from a woody caudex, often branched above, glabrate or with various kinds of pubescence. Stipules usually subulate, connate at base or for some distance along their length. Leaves alternate, either basal or cauline, palmately compound; leaflets linear to oblanceolate or obovate. Flowers pedicellate, in terminal, sessile, or pedunculate racemes. Calyx 2-lipped, three sepals fused into a nearly entire lower lip, two more or less connate to form an upper lip. Corolla papilionaceous, blue, purplish, yellow, white, or pink. Standard reflexed to a greater or lesser extent; wings often fused at the tip; keel petals fused above and below for their outer half, often ciliate. Stamens 10, monodelphous. Fruit a violently dehiscing legume; seeds 2 to several.

A genus of about 200 species, predominantly of the New World and Mediterranean region.

DUNN, D. B., and J. M. GILLETT. The Lupines of Canada and Alaska. Can. Dept. Agr. Res. Branch Monogr. **2**. 1966.

1. Plants annual.
   2. Ovules and seeds usually 2, sometimes only 1; racemes distinctly verticillate; flowers densely ciliate near the claws of the wings and keel; introduced on Vancouver Island ..... *L. densiflorus*
   2. Ovules and seeds usually 4, rarely 3; racemes not distinctly verticillate.
      3. Leaflets generally glabrous above, occasionally with a few scattered hairs; standard reflexed beyond the midpoint..... *L. polycarpus*
      3. Leaflets pubescent above; standard reflexed at midpoint.
         Standard narrowly oblong, 6–9 mm long, 3–6 mm wide..... *L. bicolor*
         Standard suborbicular, 7–10 mm long, 6–11 mm wide..... *L. vallicola*

1. Plants perennial.
   4. Upper lip of calyx distended backwards as a spur 0.5–3 mm long; wings often pubescent laterally near the tip, the standard generally pubescent over the central area of the back ..... *L. arbustus*
   4. Upper lip of calyx not spurred, sometimes gibbous, distended back to 0.5 mm in *L. argenteus*.
      5. Standard pubescent over most of the surface of the back, if reduced, a patch under the upper lip of the calyx or glabrous, in which case the flower sulphur-yellow.

6. Flowers pale sulphur-yellow; standard reflexed beyond the midpoint; the apical notch between the wings and the standard very small ..... *L. suphureus*

6. Flowers blue.

Standard reflexed beyond the midpoint; the apical notch between the wings and the standard very small ..... *L. leucophyllus*

Standard reflexed at midpoint; the apical notch between the wings and the standard quite wide ..... *L. sericeus*

5. Standard glabrous on the back or at most a few cilia on the dorsal crest near the tip, or a small patch of pubescence on the dorsal side of the sulcus beneath the tips of the upper calyx lip; flowers normally blue or purple, yellow in *L. arboreus*.

7. Leaflets sericeous above, generally amply pubescent, occasionally glabrous above in *L. littoralis* then maritime, with stems prostrate to decumbent.

8. Plants forming a tuft; foliage less than 10 cm tall; peduncles exceeding the foliage; racemes subcapitate to densely verticillate to 6 cm long in fruit; standard 8 mm long, obovate-oval; near timberline ..... *L. lyallii*

8. Plants tufted or matted; generally the foliage over 10 cm tall, if less then the flowers with an orbicular standard over 10 mm long; at lower elevations.

9. Tufted; the foliage commonly 10 cm or less in height, only 1–3 cauline leaves, standard orbicular; in the arid transition zone in the Columbia River drainage east of the Cascades ..... *L. minimus*

9. Tufted or matted, the foliage more than 10 cm from base and commonly with 4 to numerous cauline leaves.

10. Plants prostrate to decumbent; standard orbicular; martime ..... *L. littoralis*

10. Plants erect, standard elliptic to oblong-elliptic or obovate.

11. Standard elliptic to oblong-elliptic, glabrous, finely sericeous; mostly lower elevations *L. lepidus*

11. Standard obovate; plants densely pubescent.

12. Umbo of keel exposed below the wings; standard tip obtusely pointed; plants with spreading or ascending hispid hairs; Vancouver Island only, introduced ..... *L. formosus*

12. Umbo of keel covered by wings; standard tip rounded.

Keel glabrous or only a few cilia toward point; extreme northwestern British Columbia and Yukon ..... *L. kuschei*

Keel ciliate along much of the upper edge, mostly toward the point; southeastern British Columbia and adjacent Alberta ..... *L. wyethii*

7. Leaflets generally glabrous above, occasionally sparsely puberulent to sparsely strigose above.

13. Keel densely ciliate above near the claws as well as along most of the upper edge; all petioles short, generally less than twice the length of the leaflets.

14. All petioles about the same length as the leaflets, along well-branched stems, with numerous nodes and axillary clusters of leaves; stems slender; plants subshrubby or decumbent.

Plants glabrous in appearance, actually minutely puberulent except for the glabrous upper leaf surface; commonly decumbent; flowers blue; maritime ..... *L. rivularis*

Plants silvery sericeous except for the glabrous upper leaf surface; flowers yellow; introduced on Vancouver Island and some Gulf Islands ..... *L. arboreus*

14. Petioles 1½–2 times as long as the leaflets; stems generally hollow; leaflets occasionally sparsely pubescent above.

Pubescence spreading, long shaggy lanate; bracts long and filamentous; stems generally hollow; lower lips of calyx broad, boat-shaped ..... *L. nootkatensis*

Pubescence appressed or hispidulous with scattered longer ascending hairs; bracts lance–subulate; stems hollow, slender, lower calyx lip slender, lanceolate ..... *L. arcticus*

13. Keel ciliate toward the point or glabrous; petiole length various; foliage various.

15. Stems hollow with elongated basal petioles 1.5–6 dm long; stems often 5–15 dm tall; racemes elongated, often over 3 dm long.

Bracts subpersistent; flowers small, about 10 mm long or less; pedicels 1–3 mm long; leaflets 7–11; keel ciliate; montane ..... *L. burkei*

Bracts caducous; flowers 12–16 mm long; pedicels 6–9 mm long; leaflets 10–17; keel normally glabrous; moist meadows and streambanks ..... *L. polyphyllus*

15. Stems slender, solid or hollow; leaves mostly cauline except in *L. arcticus*.

16. Flowers 14–20 mm long; standard reflexed at midpoint, glabrous; keel glabrous or ciliate ..... *L. arcticus*

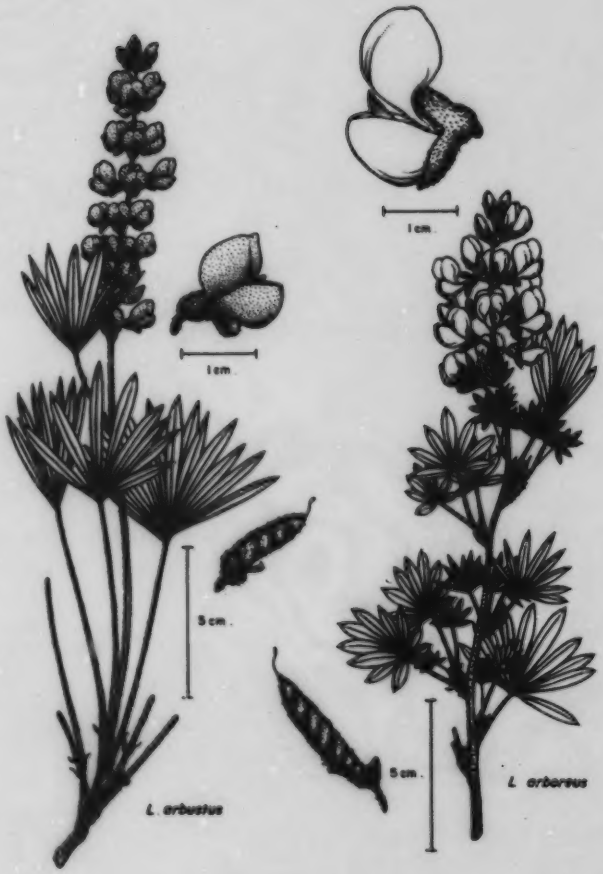
16. Flowers 8–10 mm long; standard reflexed beyond the midpoint, commonly with a small patch of pubescence under the upper lip of the calyx; leaves mostly cauline and numerous.

Upper lip of calyx gibbous to slightly spurred; keel ciliate near the point, petioles 2–4 cm long; southern Interior only..... ..... *L. argenteus*

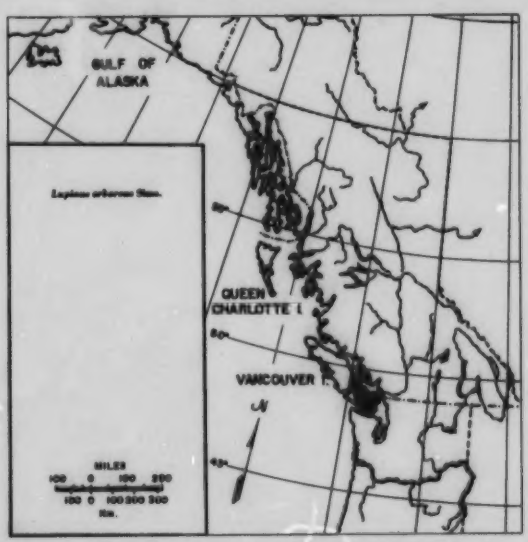
Upper calyx lip not gibbous; keel glabrous; lower petioles up to 12 cm long; Vancouver Island only, possibly introduced..... ..... *L. oreganus*

1. ***Lupinus arboreus* Sims.**—Short-lived, somewhat woody perennial. Stems suberect to decumbent, up to 1 m or more tall, minutely puberulent, much branched with numerous leafy, short branches in the axils of the primary leaves. Petioles of the primary leaves not much longer than the leaflets; leaflets 7–10, at most 4.5 cm. long, linear to linear-oblanceolate, acute to obtuse, glabrous above, puberulent beneath; stipules subulate. Racemes considerably longer than the peduncles, more or less verticillate, bracts caducous, lanceolate to subulate, densely sericeous; pedicels up to 12 mm long. Calyx silky sericeous, both lips entire or the upper bidentate, the lower deep boat-shaped, deflexed. Corolla yellow; standard orbicular, reflexed below the midpoint, usually glabrous; wings glabrous, 13–21 mm long; keel ciliate, particularly toward the point. Pods about 5 cm long, villous with long, spreading hairs; seeds 8–11.

Sandy coastal situations; California. Locally introduced near Victoria and some of the Gulf Islands.

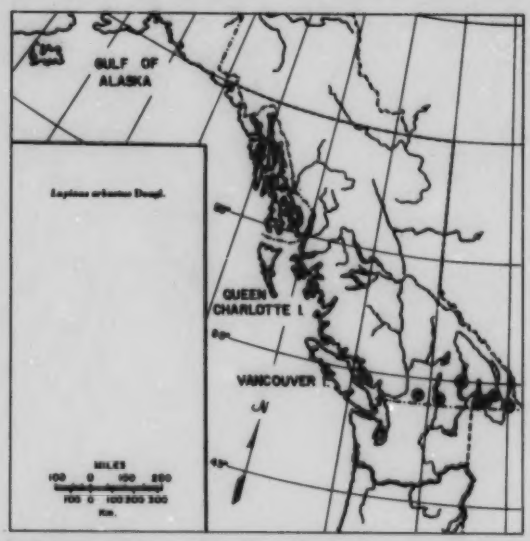


Spurred lupine (left); Tree lupine (right).



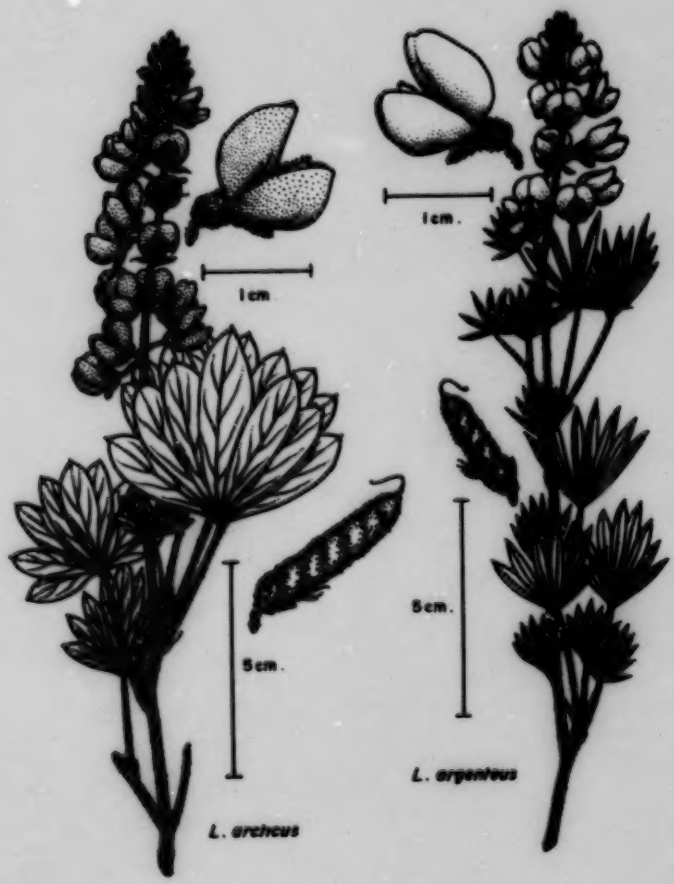
2. *Lupinus arbustus* Dougl.—Perennial with woody caudex. Stems up to 6 dm tall, several, simple or branching later from the upper nodes, slender, finely and thinly sericeous. Basal leaves usually present at anthesis with petioles up to 15 cm long, those of the upper cauline leaves shorter than the leaflets; leaflets 7–11, the largest about 5 cm long, rounded or obtuse at the tips but sometimes acute in intermediate forms, commonly glabrous above or rarely sparsely pubescent. Peduncles up to 6 cm long; racemes about twice as long, lax or dense; bracts either caducous or not; pedicels 5 mm long or more. Flowers less than 13 mm long. Calyx gibbous or with a spur about 1 mm long. Standard finely pubescent in the central area but sometimes glabrous; wings mostly glabrous but in some cases pubescent near the tip; keel ciliate above near the tip, occasionally glabrous. Pods about 3 cm long. villous; seeds 3–6 (*L. laxiflorus* Dougl. in part).

Damp woodland situations; southern British Columbia to central Washington, east to western Alberta, Montana, Idaho, and eastern Oregon. Rare in British Columbia, only east of Cascades and south of Lat. 50°N.

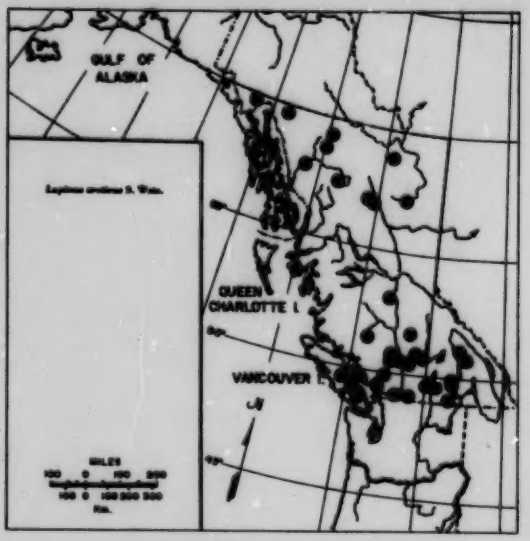


3. *Lupinus arcticus* Lindl.—Herbaceous perennial with several stems arising from a branched rootstock. Stems up to 6 dm tall, slender, hollow, finely appressed puberulent with sparse ascending hairs up to 1 mm long. Leaves mostly radicle with long petioles (in the north) or mostly cauline and short petioles (in the south); leaflets 6–8, oblanceolate, mucronate, rounded to obtuse, glabrous above, occasionally sparsely strigose, strigose beneath, about 5 cm long. Peduncles up to 8 cm long; racemes commonly longer, verticillate or subverticillate; bracts subulate to 5 setaceous, subpersistent to caducous; pedicels filiform about 5 mm long. Calyx lips subequal and subentire, or the upper quite deeply cleft. Corolla bluish; banner orbicular, glabrous, tip emarginate; wings usually glabrous, up to 17 mm long; keel arcuate, sparsely ciliate for most of its length but densest near the middle. Pods about 4 cm long, more or less densely strigose pubescent; seeds 6–8 (*L. latifolius* Agardh).

Open ground generally; Alaska to Washington, east to Northwest Territories and southeastern Alberta. Very common throughout the Province.

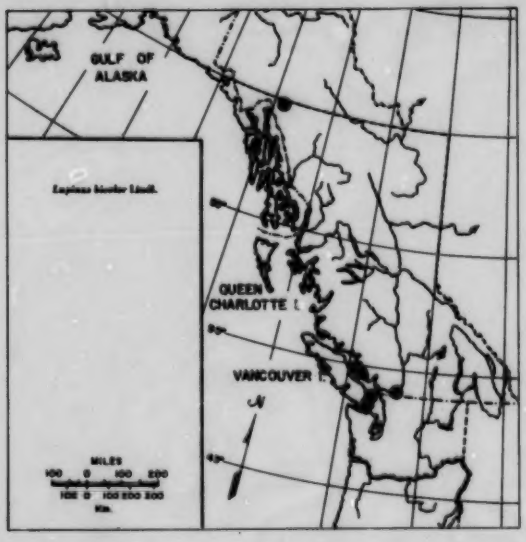


Arctic lupine (left); Silvery lupine (right).



4. *Lupinus argenteus* Pursh—Perennial, 4–7 dm. tall, with clustered, branched stems, sericeous to strigose, leafy above, basal leaves fallen by anthesis. Petioles of lower leaves up to 8 cm long; leaflets 7–9, elliptic to linear oblanceolate, glabrous or sparsely strigose above, tips obtuse or acute. Racemes much longer than the peduncles, subverticills about 11 cm apart; bracts subulate, 2–3 mm long, persistent or caducous, pedicels 2–4 mm long. Calyx somewhat gibbous at base. Corolla 8–10 mm long; blue, sometimes off-white; standard orbicular, reflexed beyond the midpoint, spot of pubescence beneath or near the tip of the calyx; wings glabrous, 10–12 mm long; keel ciliate along upper edge near the point. Pods densely sericeous, 2–3 cm long; seeds 4–6.

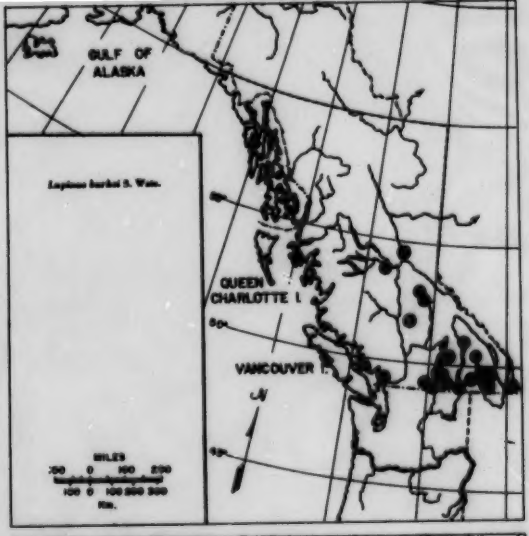
Sage brush and ponderosa pine areas to subalpine ridges; central Oregon, south to northeastern California, east to Alberta, Montana, and South Dakota, south in the Rocky Mountains to New Mexico. Very rare with us, known only from the southern Interior.



5. *Lupinus bicolor* Lindl.—Annual. Stems erect or suberect, longest branches usually basal, pubescence appressed or spreading ascending. Leaflets 6–7, up to 35 mm long, linear-oblanceolate, acute or obtuse, appressed pubescent on both surfaces; stipules up to 12 mm long, connate to the petioles for about half their length. Peduncles longer than the racemes; verticils commonly 2; bracts fugacious; pedicels about 3 mm long, ascending-pubescent. Flowers bluish. Calyx silky, subappressed-pubescent; lower lip about 5 mm long, straight tridentate, lobes of the upper shorter. Standard 6–9 mm long, oblong, truncate, sometimes mucronate, reflex at the midpoint, wings and keel about as long as the standard; keel ciliate on the distal half. Pods about 2 cm long, subappressed pubescent; seeds 4–8 (*L. micranthus* Dougl.).

Sandy or well-drained coastal soils; southwestern British Columbia to northern California. Known with us from southeastern Vancouver Island and the adjacent Mainland.

Burke's lupine (left); Two-colour lupine (right).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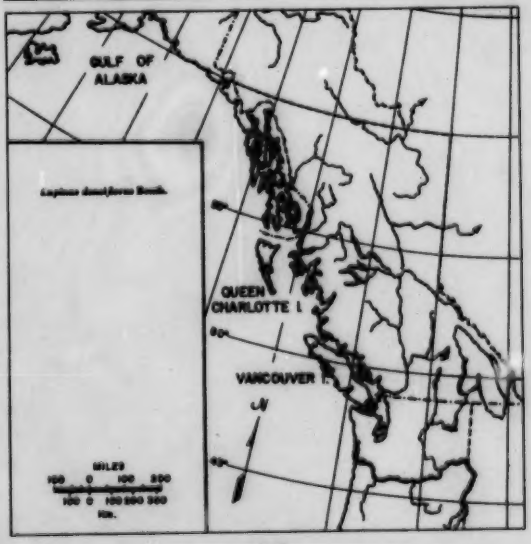
VANCOUVER I.
MILES
100 0 100 200
100 0 100 200 300
Km.


GULF OF
ALASKA
QUEEN
CHARLOTTE I.
VANCOUVER I.
MILES
100 0 100 200
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Km.

6. ***Lupinus burkei*** **S. Wats.**—Perennial. Stems up to 9 dm tall, several from a rootstock, hollow, glabrate, hairs when present sparse and appressed. Leaves both radicle and cauline, the latter 3 or 4, radicle petioles up to 30 cm long; stipules 10–18 mm long. Leaflets 7–11, as much as 10 cm long, oblanceolate, mucronate, glabrous above, thinly strigose beneath. Racemes dense, at least 20 cm long; peduncle somewhat shorter; bracts lance-attenuate, persistent; pedicels about 3 mm long. Calyx lips very thin, almost transparent, the upper about 5 mm long, bifid, the lower somewhat longer, nearly entire, both finely silky-villous to sericeous. Corolla bright blue, usually glabrous except the keel sometimes slightly ciliate about midway on the upper margin, standard whitish or yellowish at centre, reflexed near the midpoint. Pods densely lanate (*L. polyphyllus* var. *burkei* (S. Wats.) Hitchc.).

Wet meadows and stream sides; British Columbia to Wyoming. Known with us only from east of the Coast Mountains.

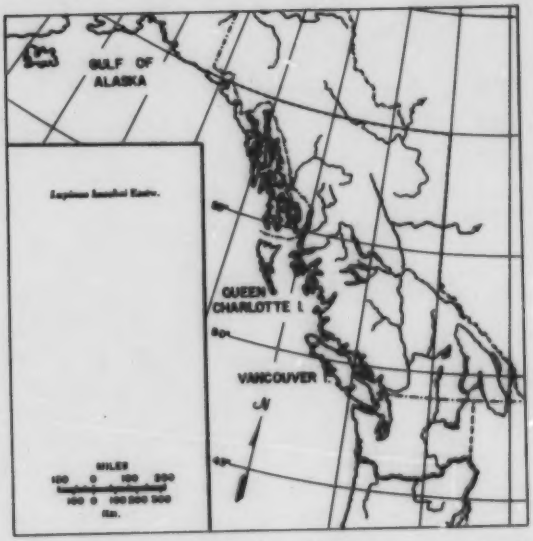
7. ***Lupinus densiflorus*** **Benth.**—Annual. Stems erect, about 25 cm tall, hollow, with long hairs abundantly spreading to retrorsely pilose. First internode on stem up to 12 cm long, those above much shorter; petioles of primary leaves up to 14 cm. long, first in a basal rosette, later clustered at branch tops, pubescence as on stems; stipules about 3 cm long, free tip subulate to filiform. Leaflets 8–10, elliptic oblanceolate, acute to obtuse, glabrous above, spreading pilose beneath, up to 32 mm long. Racemes with 2–7 verticils. Flowers white to yellowish-white, often pinkish, all parts persistent as dried membranes about the pod. Calyx hirsute, upper lip short, bifid with membranous rounded tips, lower much longer, rostrate, tridentate. Standard oblong, about 13 mm long, sulcus hispidulous within; wings about the same length, narrowly oblong, sparsely ciliate below the claws, densely ciliate at the angle above the claws. Pod rhomboid, hirsute, less than 2 cm long; seeds 2 (*L. microcarpus* Sims var. *scopulorum* C. P. Smith).

Open places; Vancouver Island to Baja California; Chili. Known only from the vicinity of Victoria where it was probably introduced.

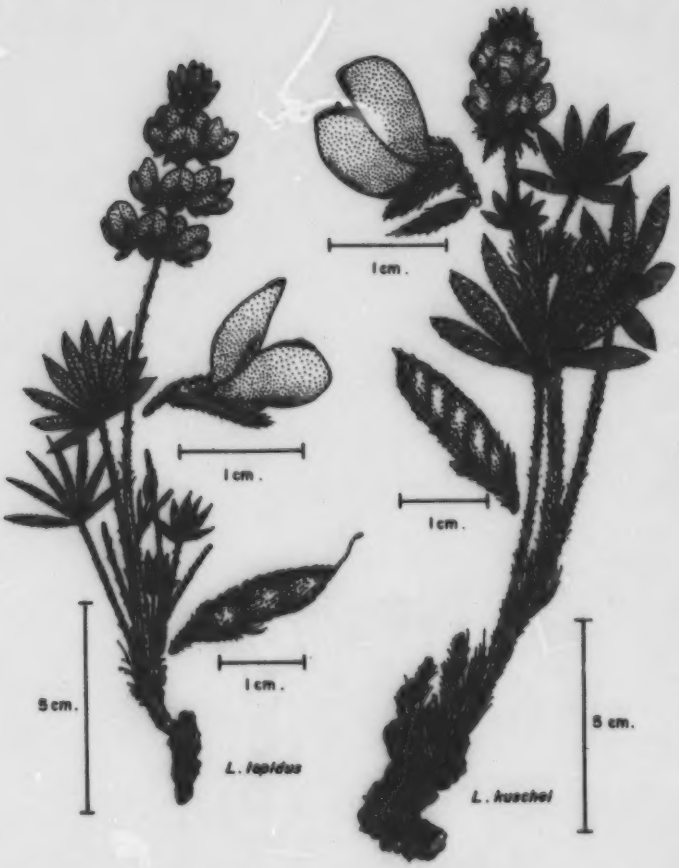
Dense-flowered lupine (left); Summer lupine (right).

8. *Lupinus formosus* Greene—Perennial. Stems solid, decumbent to ascending, up to 6 dm tall, abundantly finely canescent with kinky hairs and longer spreading or ascending pilose to hirsute hairs. Petioles with similar pubescence, 2–5 cm long; stipules subulate up to 10 mm long, the lower connate to the petiole for about half their length. Leaflets 6–8, up to 4 cm long, oblanceolate, tips obtuse-rounded, mucronate, densely sericeous on both surfaces. Peduncles 7–10 cm long on the primary inflorescence, much shorter on the branches. Primary racemes 2–3 dm long, secondary 8–10 cm, generally verticillate or subverticillate; bracts caducous, about 6 mm long, attenuate-subulate; pedicels about 3 mm long, densely spreading hispidulous. Calyx densely sericeous to canescent outside but glabrous over most of the inside but sericeous near the tips of the lips, upper lip bifid, the lower trifid, slightly longer. Flowers blue; standard suborbicular, reflexed at midpoint but leaving a narrow notch between the standard tip and the wings, the point of the standard extending beyond the reflexed sides; wings 13–15 mm long; keel glabrous, falcate, point slender-arcuate. Pods about 3 cm long, canescent, also with long pilose hairs; seeds 4–5.

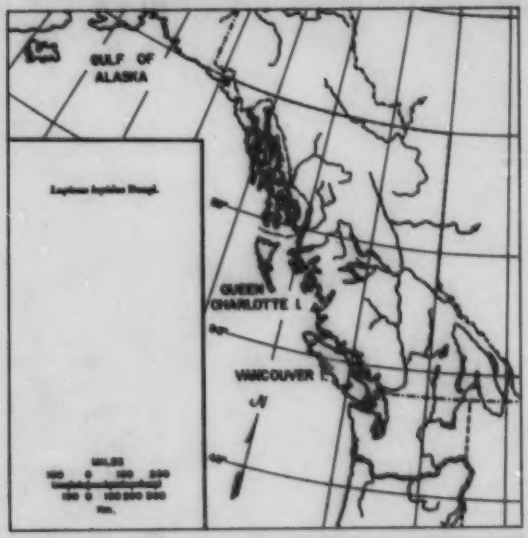
Open places; Oregon to Baja California. A colony in the vicinity of Victoria was probably introduced.



9. *Lupinus kuschei* Eastw.—Perennial from a woody caudex, with many flowering stems, densely silky-sericeous except the corolla. Stems erect, up to 3 dm tall with 3–4 cauline leaves. Lower petioles about twice as long as the longest leaflet, the upper progressively shorter; primary cauline leaves with a fascicle of several axillary leaves; leaflets 6–8, up to 4 cm long, elliptic-oblanceolate, acute, mucronate, sericeous on both sides but greener above. Racemes dense, 3–6 verticils; peduncles as much as 5 cm long; bracts lance-subulate, subpersistent; pedicels about 4 mm long with abundant spreading hairs. Calyx slightly gibbous above, upper lip tridentate, about 7 mm long, the lower bidentate, slightly shorter. Corolla bright blue, usually completely glabrous; flowers about 12 mm long; standard reflexed at or below the midpoint, with light yellow centre-spot. Pod soft villous, up to 25 mm long; seeds 4–6.



Prairie lupine (left); Yukon lupine (right).


GULF OF
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QUEEN
CHARLOTTE I.
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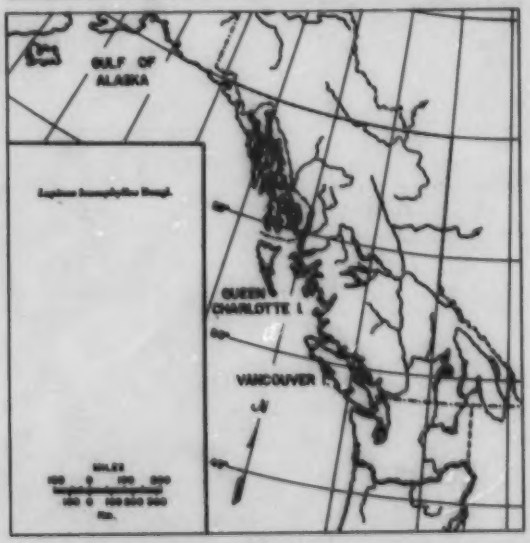

GULF OF
ALASKA
QUEEN
CHARLOTTE I.
VANCOUVER I.

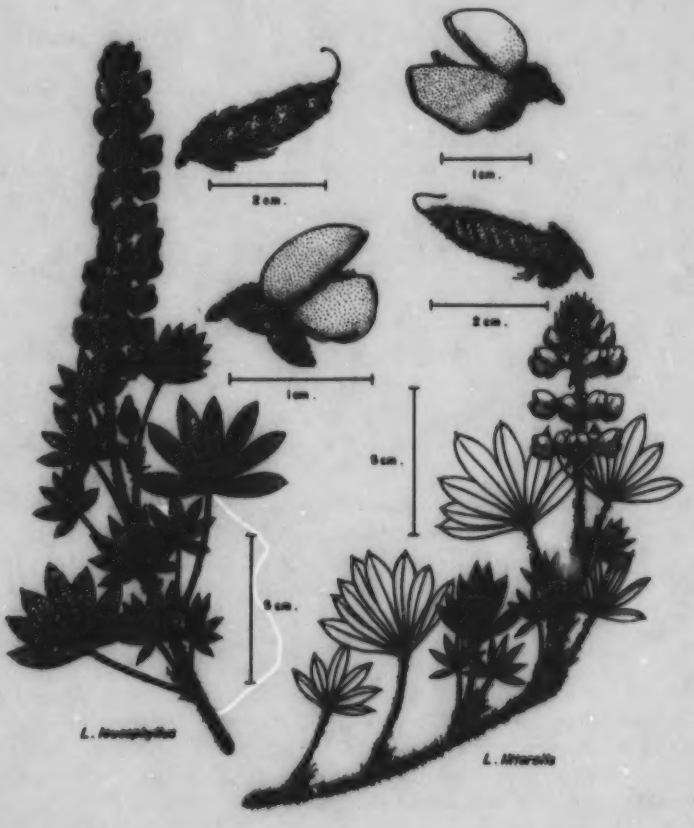
Open pine woods and river terraces; northern British Columbia and adjacent Yukon. Known in the Province only from the Cassiar district.

10. *Lupinus lepidus* Dougl.—Perennial, cæspitose from a caudex. Stems low and somewhat matted to erect, up to about 4 dm tall, slender, sericeous with some longer pilose hairs. Cauline leaves 1–4; petioles of radicle leaves much longer than the largest leaflet; leaflets 6–10, elliptic-oblanceolate, to 5.5 cm long, mostly conduplicate, arcuate, acute, mucronate, finely sericeous on both sides. Racemes rather closely flowered, about as long as the peduncles; pedicels about 2 mm long. Flowers bluish to white, crowded, verticillate. Calyx sericeous-villous, both lips about 7 mm long, the upper bifid, not saccate or spurred, the lower entire. Standard obovate, about 10 mm long, reflexed below the midpoint, glabrous; wings glabrous, rather narrow; keel ciliate toward the tip . Pods up to 2 cm long, hairy; seeds 2–4.

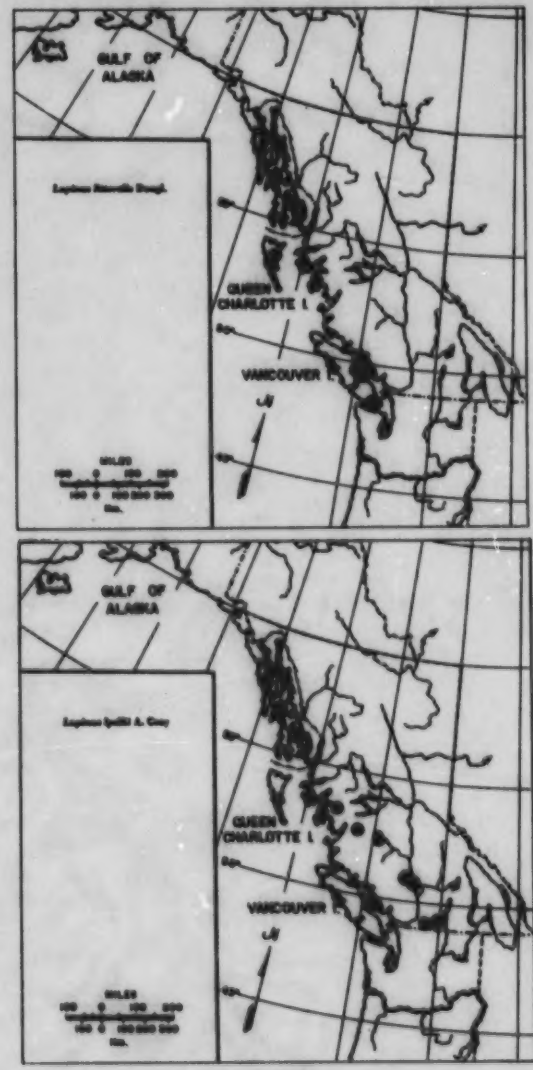
Dry, often gravelly soil; southwestern British Columbia to California, east to Montana, Wyoming, and Colorado. Known only from the vicinity of Victoria.

11. *Lupinus leucophyllus* Dougl.—Perennial with branched crown and several stems. Stems erect, up to 9 dm tall, densely woolly with additional longer spreading or retrorse hairs. Leaves mainly cauline; petioles 1–3 times as long as the blades; leaflets 7–10, as much as 6 cm long, elliptic-oblanceolate, woolly on both sides. Racemes densely verticillate, much longer than the peduncles; bracts caducous, subulate to long attenuate; pedicels not more than 3 mm long. Flowers about 11 mm long, usually pale lavender. Calyx shaggy pubescent to silky, not spurred. Standard densely pubescent on the back, only slightly reflexed above the midpoint; wings essentially glabrous; keel ciliate. Pods up to 2.5 cm long, shaggy-tomentose with brownish hairs; seeds 4–6.

Open pine woods; southern British Columbia to northeastern California, east to Idaho, Montana, Wyoming, and Nevada. Known only from near Lumby.



Velvet lupine (left); Seashore lupine (right).

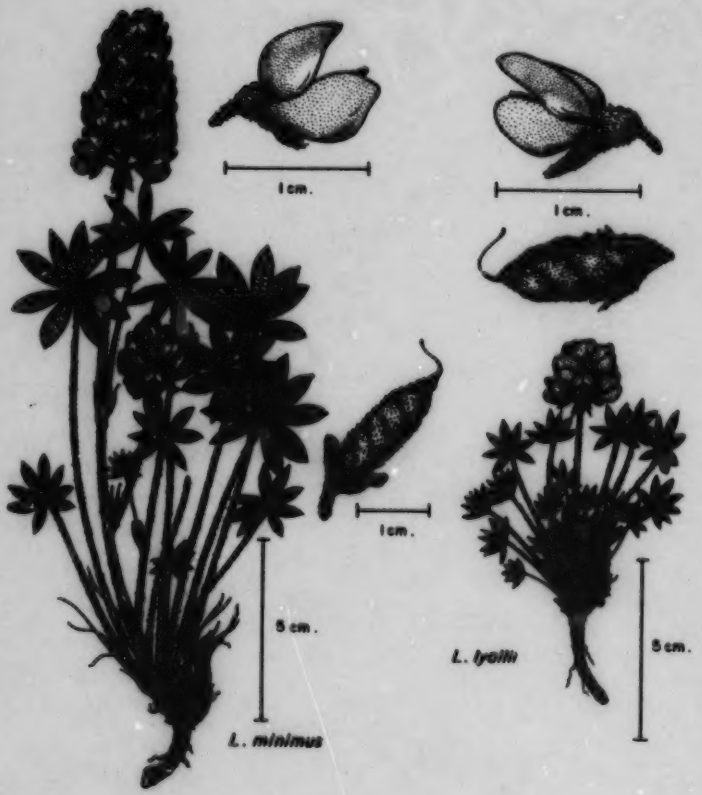

GULF OF ALASKA
QUEEN CHARLOTTE I.
VANCOUVER I.
GULF OF ALASKA
QUEEN CHARLOTTE I.
VANCOUVER I.

12. ***Lupinus littoralis*** **Dougl.**—Perennial. Stems slender, prostrate, up to 6 dm long, minutely strigose with long, pilose, spreading hairs. Petioles short, slightly longer than the longest leaflet, strigose; stipules subulate, attenuate, connate for about one-third their length; leaflets 6–8, linear-oblanceolate, the longest not more than 2.5 cm long, obtuse to rounded-mucronate, essentially glabrous above. Racemes loosely flowered, up to 12 cm in length at anthesis, longer in fruit; peduncle much shorter; bracts subulate-attenuate, prominent; pedicels about 4 mm long, ascending, hispidulous. Calyx finely sericeous, the lips about 5 mm long, the lower broad but not deflexed nor boat-like. Corolla about 12 mm long; banner suborbicular, pale blue to white, reflexed at or below the midpoint; wings bright blue, longer than the standard; keel ciliate for most of its length. Pods about 3.5 cm long, sparsely strigose; seeds 10–12.

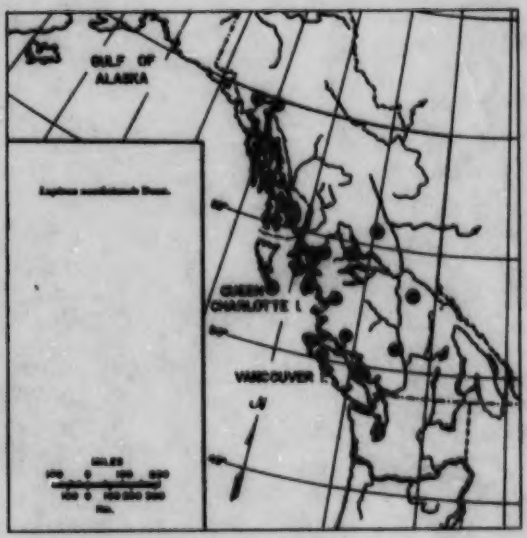
Sand beaches and dunes; Queen Charlotte Islands to northern California. In British Columbia along the Coast from about Lat. 55°N southward.

13. ***Lupinus lyallii*** **A. Gray**—Perennial. Caudex branched in older plants forming mat-like clumps. Stems poorly developed, very short, greyish-strigillose or -sericeous. Leaves mostly radicle; lower petioles less than 6 cm long; leaflets 5–7, elliptic-oblanceolate to obovate, up to 15 mm long, sericeous on both sides. Peduncles exceeding the foliage; racemes dense, not more than 4 cm long, slightly longer in fruit; bracts subulate, persistent, about 2 mm long; pedicels not much more than 1 mm long. Corolla bluish, standard often darker. Calyx sericeous, upper lip bidentate; lower entire. Standard about 8 mm long, oblong-elliptical to narrowly obovate, glabrous, rather sharply reflexed; wings glabrous; keel ciliate, sometimes densely so towards the point. Pods up to 15 mm long, sericeous; seeds 1–4.

Alpine meadows and slopes; southern British Columbia to California. Local on Mainland mountains south from about Lat. 54°N.



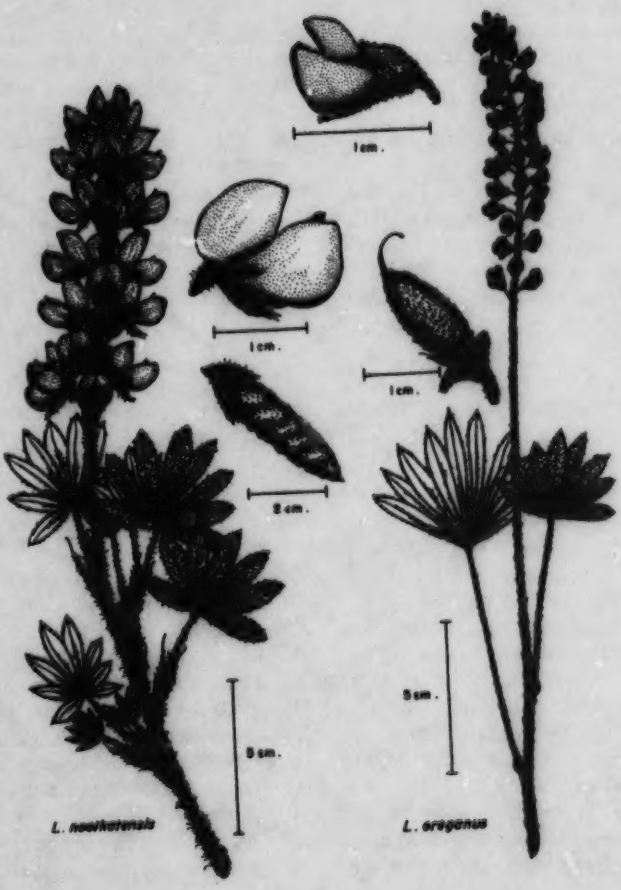
5 **Least lupine (left); Lyall's lupine (right).**


GULF OF ALASKA
QUEEN CHARLOTTE I.
VANCOUVER I.

14. ***Lupinus minimus*** **Dougl.**— Perennial, cæspitose, appressed silky-sericeous throughout. Stems usually about 1 dm tall, occasionally somewhat taller, only 1–3 cauline leaves. Leaves mostly basal, longest petiole several times longer than the longest leaflet; leaflets 6–8, 1.5–2.5 cm long, elliptic-oblanceolate, sericeous on both surfaces. Peduncles 3–10 cm long; racemes slightly longer as a rule, verticillate to subverticillate; bracts subulate, tardily deciduous, pedicels usually 2–3 mm long. Corolla bluish, standard often lighter or darker in colour. Calyx lips nearly equal, lower lip 6–7 mm long, upper slightly shorter, upper lip 2-lobed, lower entire, sericeous outside, glabrous within. Standard glabrous, reflexed near the midpoint, obovate to orbicular, about 10.5 mm long; wings slightly longer, glabrous; keel finely ciliate above particularly toward the point. Pods up to 2 cm long, hairy; seeds 2–4.

Open range land; northeastern Washington and adjacent British Columbia to western Alberta, and western Montana. Known with us only from the southern Columbia Valley.

15. ***Lupinus nootkatensis*** **Donn** — Perennial with stout woody rootstock. Stems erect, up to 1 m tall on good sites but may be only 1 dm on poor, the larger hollow, pilose, with spreading hairs, glabrate in age. Leaves all cauline; petioles rarely more than twice as long as the longest leaflet; lower stipules as much as 6 cm long, the upper shorter, woolly with long pilose hairs; leaflets 5–8, broadly oblanceolate, up to 6 cm long, rounded, generally shaggy villous below, glabrate above. Racemes rather dense on peduncles of about the same length; pedicels up to 13 cm long; bracts considerably longer, filiform. Corollas blue, often shaded with pink or white. Lower calyx lip 8–11 mm long, broad, boat-shaped, reflexed, deeply bifid, lanate without and sericeous over most of the inside; bracteole at sinus between the upper and lower lips quite conspicuous. Standard up to 19 mm long, widest below the middle, reflexed below the midpoint; wings slightly longer than the standard; keel about the same length, densely ciliate above, particularly near the claws. Pods about 5 cm long, lanate when immature, later sericeous; seeds 7–11.

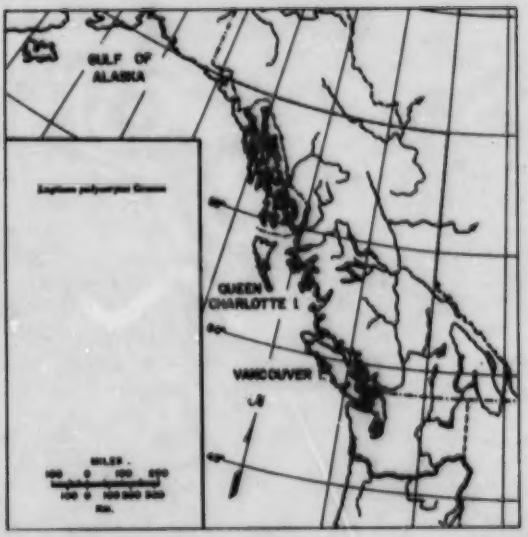


Nootka lupine (left); Oregon lupine (right).

Damp, maritime situations; coastal from Alaska to southern British Columbia. Common as far south as northern Vancouver Island, the records from the Interior may be due to introduction.

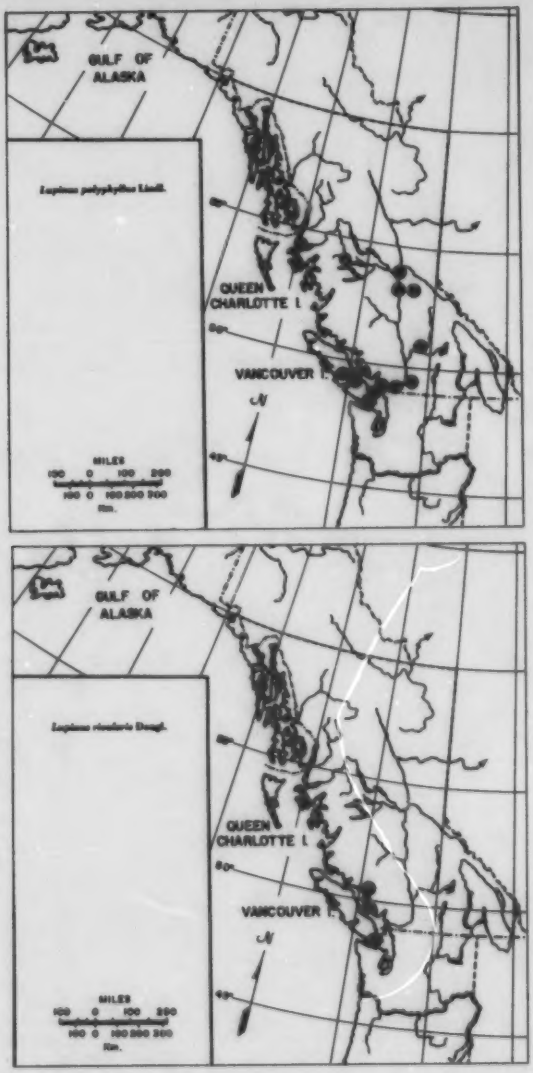
16. *Lupinus oreganus* Heller—Perennial with a branched caudex. Stems slender, 3–5 cm tall, finely puberulent with longer, appressed strigose hairs. Leaves both radicle and cauline, generally 3–4 cauline; lower petioles up to 12 cm long, upper considerably shorter; stipules setaceous, about 5 mm long, connate for half their length or less; leaflets 8–10, linear-oblanceolate, 4–6 cm long, acute mucronate, thinly strigose below, glabrous above. Peduncles 6–10 cm long, the dense racemes about twice as long, flowers scattered to subverticillate; bracts broadly lanceolate, persistent to anthesis, 4–6 mm long; pedicels about 6 mm long, ascending hispidulous. Corolla usually blue to purplish. Calyx sericeous without, glabrous within, lower lip slightly trifid, 5–7 mm long, upper lip shorter, bifid with a shallow notch. Standard glabrous, oblong, truncate-emarginate, about 9 mm long, narrow sides not covering the tip of the upper calyx lip when fresh, barely covering it when pressed, reflexed well beyond the midpoint producing a very small notch between the wing tips and the banner tip; wings oblong, 8–9 mm long; keel glabrous, tip falcate; seeds usually 4 (*L. sulphureus* Dougl. var. *kinkaidii* (C. P. Smith) C. L. Hitchc.).

Oregon. Known in British Columbia only from the vicinity of Victoria where it is probably adventive.



17. *Lupinus polycarpus* Greene—Annual. Stems erect to suberect, as much as 4.5 dm tall, often less, branched mostly at the base, sparsely appressed-pubescent, lacking long hairs. Leaflets 5–7, up to 4 cm long, linear-oblong to elliptic or oblanceolate, upper surface usually glabrous and green; longest petiole about twice as long as the longest leaflet; stipules 6–17 mm long, adnate to the petiole for about one-third their length. Racemes small, peduncu-late, raised above the leaves, comparatively few-flowered; bracts up to 5 mm long, fugacious; pedicels less than 2 mm long. Calyx pubescent with short hairs, lips subequal about 3 mm long. Flowers bluish; standard heart-shaped, about 7 mm long; other petals about

Small-flowered lupine (left); Large-leafed lupine (right).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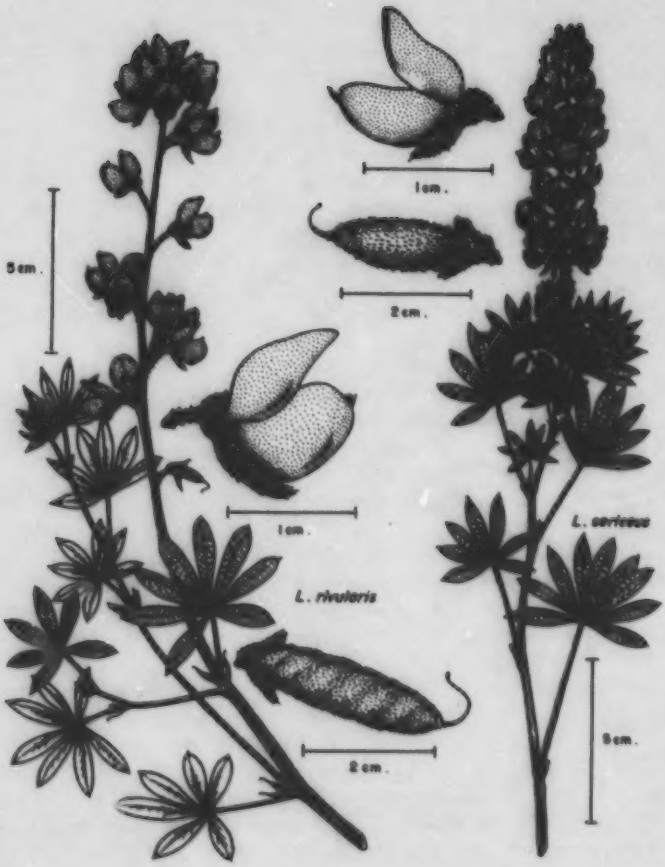
the same length, glabrous except the keel, which is ciliate on the upper half. Pods about 3 cm long, pubescent with subappressed hairs or glabrate; seeds 5–7 (*L. micranthus* Dougl.).

Gravelly and sandy areas in the open; southern British Columbia to California, mostly west of the coastal mountains. In British Columbia known only from southeastern Vancouver Island.

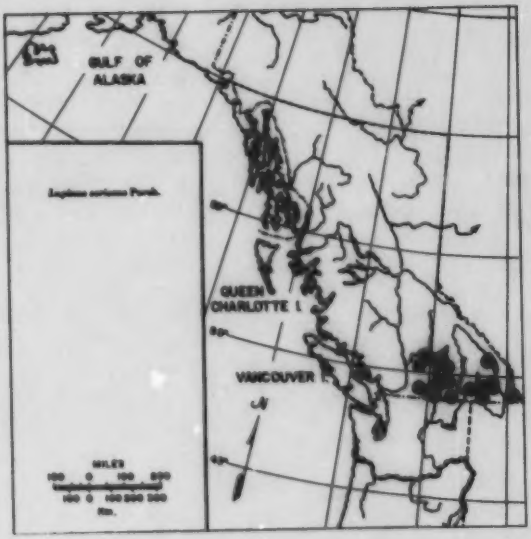
18. *Lupinus polyphyllus* Lindl.—Perennial with branched caudex, subrhizomatous, producing clumps. Stems erect, up to 1.5 m tall, unbranched, hollow, glabrate but pilose to hirsute through introgression, minute appressed puberulent undercoat, generally with 3–5 cauline leaves. Lower cauline leaves with petioles 3–6 times as long as the longest leaflet; stipules gradually shortened upwards from 3.5–1 cm, connate except at the tip. Leaflets 10–17, up to 12 cm long, elliptic-oblanceolate, acute to acuminate, glabrous above, sparsely strigose below. Racemes as much as 40 cm long, much longer than the peduncles, usually dense, flowers verticillate or not; bracts caducous, subulate to lanceolate, about 13 mm long; pedicels up to 9 mm long, spreading to ascending, spreading hispidulous. Calyx sericeous to puberulent, lips nearly equal, 4–7 mm long. Corolla bluish to violet, glabrous; standard as much as 15 mm long, reflexed at the midpoint; wings slightly longer; keel slightly exposed, not ciliate. Pods up to 5 cm long, arcuate, densely lanate with long hairs; seeds 6–10.

Wet, open, and disturbed habitats; Alaska to central California, east to Alberta and Colorado. In British Columbia mostly coastal but also in the Fraser River drainage inland.

19. *Lupinus rivularis* Dougl.—Perennial from a branched caudex. Stems several, as much as 6 dm tall, often decumbent, generally weak and ascending, essentially glabrous, internodes longer than the petioles and these shorter than the leaflets. Leaflets 6–9, up to 5 cm long, narrowly oblanceolate, glabrous above, thinly and minutely pubescent below, rounded to obtuse and mucronate. Peduncles up to 9 cm long, considerably shorter than the racemes with 5–8 well-separated verticils; bracts subulate; pedicels 6–10 mm long. Calyx gibbous at base above, sericeous to strigillose,



Streambank lupine (left); Silky lupine (right).


GULF OF ALASKA
QUEEN CHARLOTTE I.
VANCOUVER

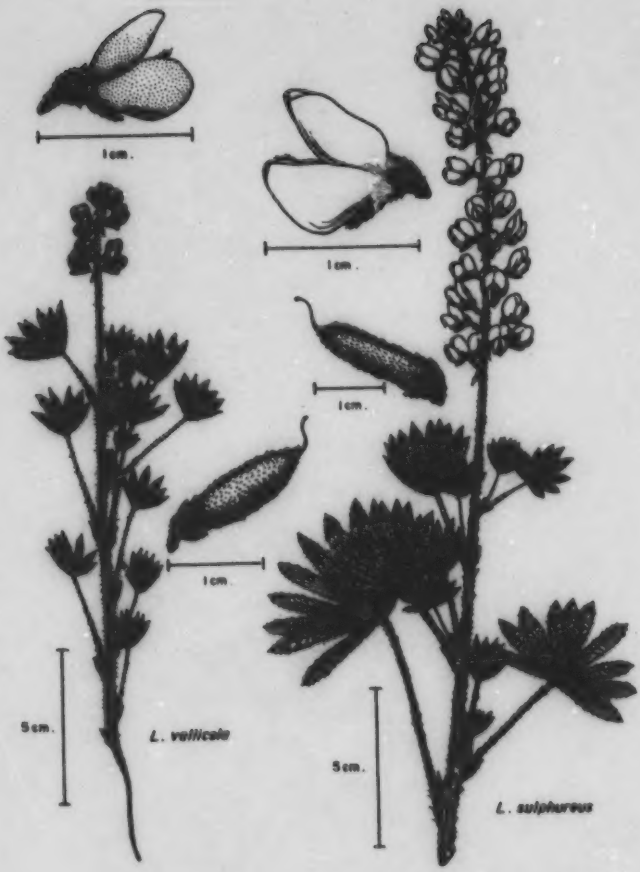
upper lip bifid, about 7 mm long, the lower more or less boat-shaped. Corolla pale to rather deep blue; standard orbicular glabrous, reflexed at the midpoint; wings and keel about the same length as the banner, wings glabrous but the keel ciliate the entire length of the upper margin. Pods to 5 cm long, minutely pubescent; seeds 6–10.

Rather open lowland situations; southwestern British Columbia to California west of the coastal mountains. Known from old collection from near Sooke, Vancouver Island, and possibly from the head of Bute Inlet.

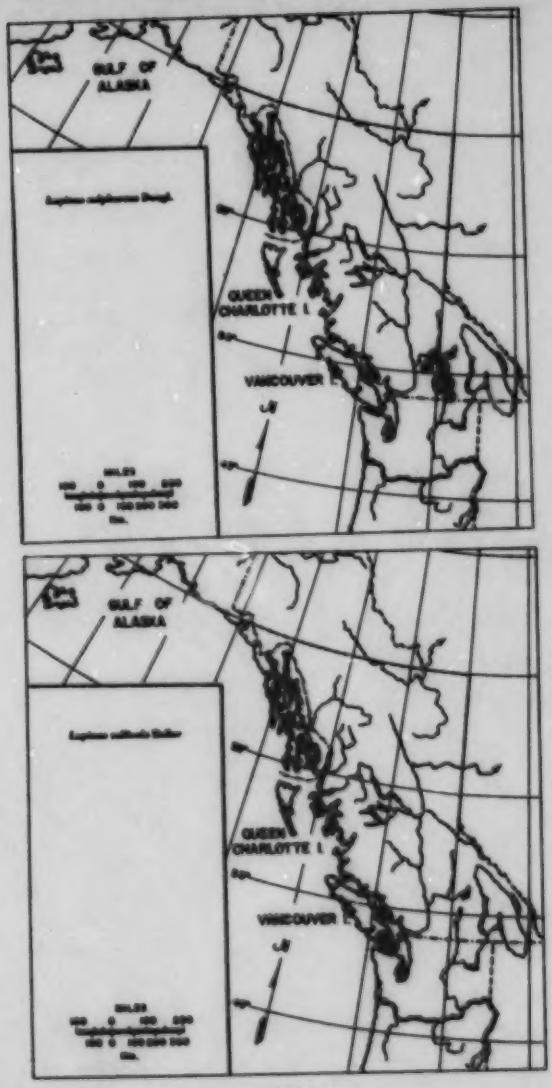
20. ***Lupinus sericeus*** **Pursh** — Perennial, caudex usually branching. Stems 1 to several, up to 6 dm tall, sericeous throughout, usually densely so. Basal leaves generally present at anthesis together with numerous cauline leaves; lower petioles as much as 3 times as long as the longest leaflet; leaflets 5–9, longest about 6 cm long, oblanceolate, acute to obtuse, mucronate, about equally sericeous on both sides with appressed hairs. Racemes loose, usually several times as long as the peduncles; pedicels as much as 6 mm long, hispidulous; bracts lanceolate, up to 10 mm long, caducous to persistent. Calyx densely canescent, upper lip bidentate, sometimes slightly saccate but not spurred, lower lip slightly longer, entire. Corollas mostly lavender and blue but sometimes yellowish or whitish; standard sericeous over most of the back, obovate, reflexed at or below the midpoint; wings glabrous or with a few hairs at the base of the blade, shorter than the keel; keel ciliate, particularly towards the point. Pods about 3 cm long, densely sericeous; seeds 4–6.

Open areas generally, east of the coastal mountains; British Columbia to California and Arizona, east to Alberta and through the Rocky Mountains to New Mexico. Common with us south from about Lat. 55°N.

21. ***Lupinus sulphureus*** **Dougl.**—Perennial with branched caudex. Stems erect, up to 6 dm tall, with two types of hair but both appressed, strigose to sericeous. Leaves cauline, the lowest discoloured or caducous by full anthesis; longest petiole about as long as the longest leaflet; stipules subulate, connate for about 4 mm.



Open lupine (left); Sulphur lupine (right).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VANCOUVER

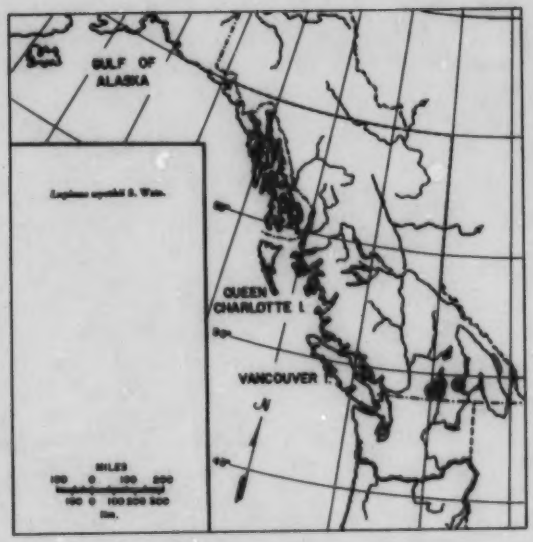
Leaflets 10–13, up to 5 cm long, linear-elliptic, acute, sericeous on both sides. Racemes 3–4 times as long as the peduncles, rather dense, verticillate or with scattered flowers; bracts subulate, caducous; pedicels about 5 mm long, ascending, hispidulous. Calyx sericeous-villous, gibbous above, upper lip bidentate, lower entire; Corolla bright yellow, sometime bluish; standard reflexed well above the midpoint; wings glabrous, keel ciliate along most of the upper margin. Pod about 2 cm long, densely silky-sericeous; seeds 4 or 5.

Sagebrush and open ponderosa pine forests; southern British Columbia to eastern Oregon. Known in British Columbia from the Okanagan and Nicola Valleys.

22. ***Lupinus vallicola*** **Heller.**—Annual. Stems erect to suberect, up to 4 dm tall, branching mostly at the base, minutely appressed-pubescent with numerous, longer, spreading hairs. Longest petioles about twice as long as the longest leaflets; leaflets 6–8, up to 4 cm. long, oblanceolate to linear-oblanceolate, pubescent on both surfaces; stipules adnate for about half their length. Racemes variable in length up to about 12 cm long, few-flowered; peduncles usually shorter than the racemes; pedicels not more than 5 mm long. Corolla bluish. Calyx pubescent, lobes subequal, the lower entire, the upper deeply bifid. Standard nearly orbicular, about 9 mm. long or less; wings about the same length; keel shorter, ciliate toward the tip. Pods about 2.5 cm long, pubescent with subappressed hairs; seeds 4–8 (*L. nanus* Dougl. var. *apricus* (Greene) C. P. Smith).

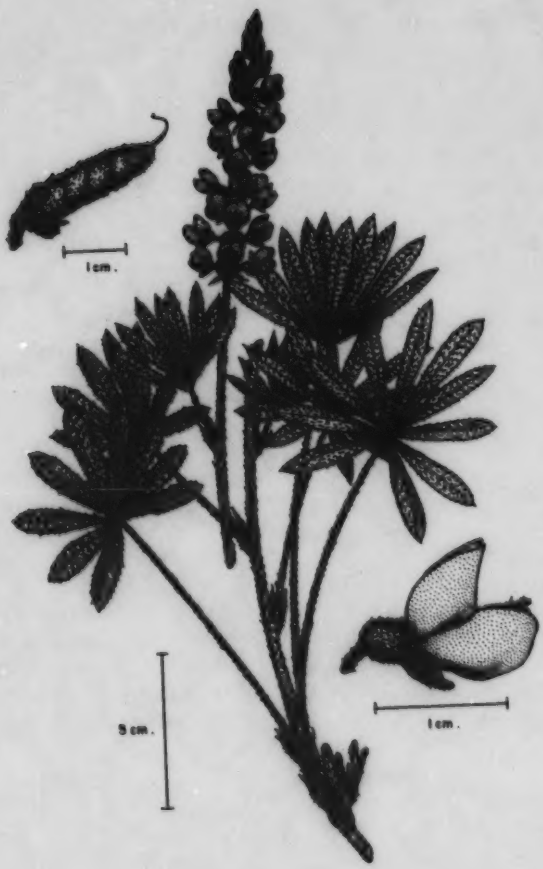
Open, grassy places; southwestern British Columbia to southern California. Known with us only from the southern tip of Vancouver Island.

23. ***Lupinus wyethii*** **S. Wats.**—Perennial with several stems from a branched caudex. Stems erect, 3–5 dm tall, appressed sericeous. Lowest petioles about twice as long as the longest leaflets; leaflets 8–11, up to 6.5 cm long, linear-elliptic to oblanceolate, acute, mucronate, sericeous on both sides; stipules filiform. Peduncles surpassing the foliage at anthesis, racemes 2–3 times as long



as the peduncles; flowers mostly scattered; bracts usually persistent, subulate-attenuate, about twice as long as the appressed sericeous pedicels. Calyx silky-sericeous, upper lip somewhat shorter than the lower, gibbous at the base, bidentate at the apex, the lower lip almost entire to slightly tridentate, both lips sericeous within near their tips. Corolla blue; standard glabrous, orbicular, reflexed at midpoint; wings glabrous, about as long as the keel; keel ciliate along most of the upper margin, particularly toward the tip. Pods about 2.5 cm long, densely silky-sericeous; seeds mostly 2–4 (*L. pumicola* A. Nels).

Open places; British Columbia to California, east to Alberta and Colorado. Found in the southern Okanagan and the Lower Arrow Lake regions.



Wyeth's lupine (*Lupinus wyethii*).

MEDICAGO L. Medic

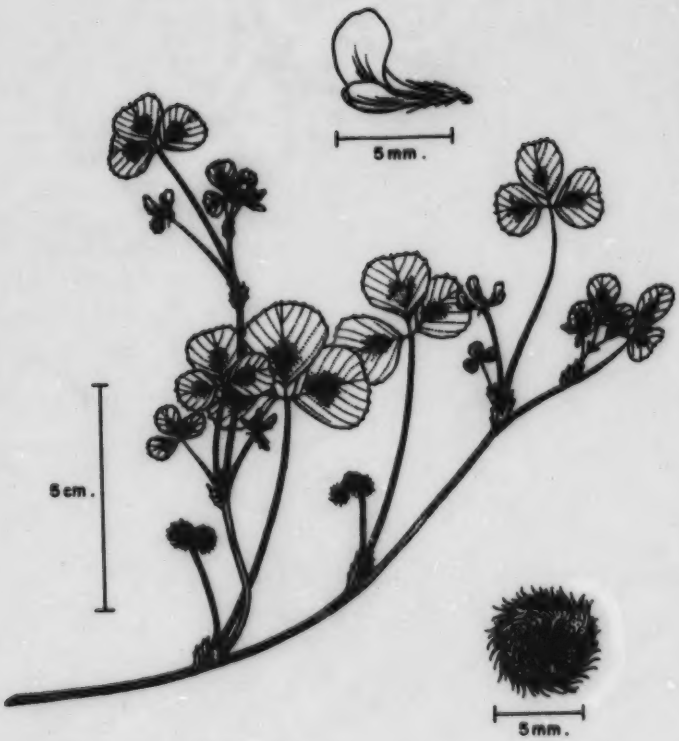
Annual or perennial herbs. Stems decumbent or erect. Leaves trifoliate, veinlets ending in teeth; stipules adnate to the petiole. Flowers papilionaceous, yellow or purple, in racemes. Calyx tube campanulate, teeth 5, nearly equal. Standard obovate to oblong, longer than the erect wings; keel blunt, shorter than the wings. Stamens diadelphous, upper stamen free. Pod spirally curved or coiled; sometimes falcate, often spiny, usually indehiscent.

About 120 species in Europe and North Africa.

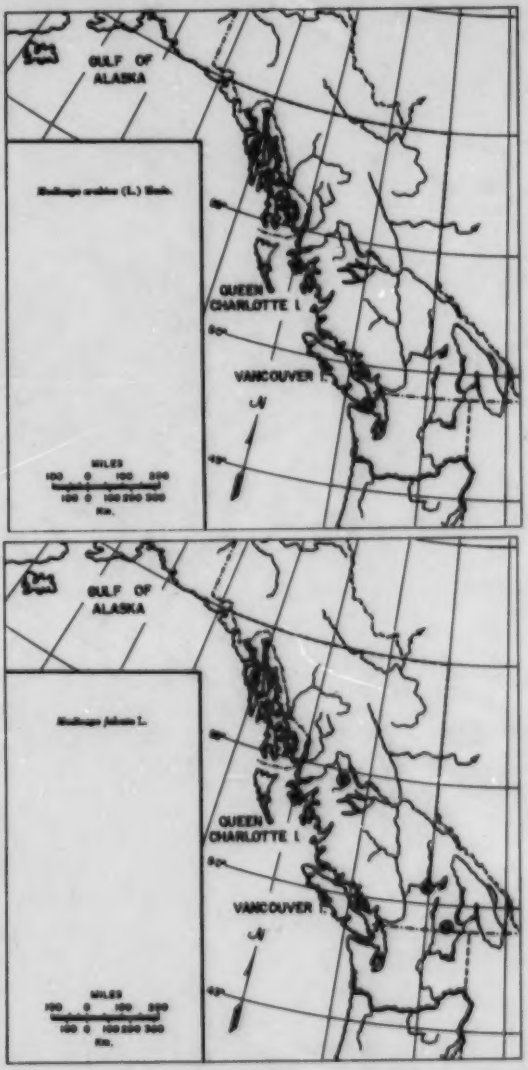
1. Flowers 7–9 mm long, yellow or purple.
   Flowers yellow; pedicel longer than the calyx tube; pod falcate or nearly straight ..... *M. falcata*
   Flowers purple; pedicel shorter than the calyx tube; pod a spiral or 2–3 turns ..... *M. sativa*
1. Flowers 2–5 mm long; yellow.
   2. Racemes many-flowered; pod unarmed, 1-seeded, black when ripe ..... *M. lupulina*
   3. Racemes 1- to 5-flowered; pod spiny or tubercled, several-seeded, brown when ripe.
      Leaflets not blotched; pedicel as long as the leaf..... *M. polymorpha*
      Leaflets usually blotched; pedicel shorter than the leaf..... *M. arabica*

1. ***Medicago arabica*** **(L.) Huds.**—Annual. Stems procumbent, as much as 6 dm long, essentially glabrous or with sparse long hairs. Leaflets up to 25 mm long, obovate or obcordate, erose-dentate toward the top, usually with a dark blotch near the centre; stipules half-cordate, dentate-lobate. Racemes 5–7 mm long; peduncles shorter than the petioles. Flowers few, yellow, about 5 mm long. Calyx, sparsely white hairy, about 2 mm long; teeth narrowly lance-deltoid, sharply acuminate, about as long as the tube. Pod 4–6 mm in diameter, spiralled in 3–5 turns with double row of curved or hooked spines.

Grassy places and waste ground; Eurasia. Adventive, established around Victoria.



Spotted medic (*Medicago arabica*).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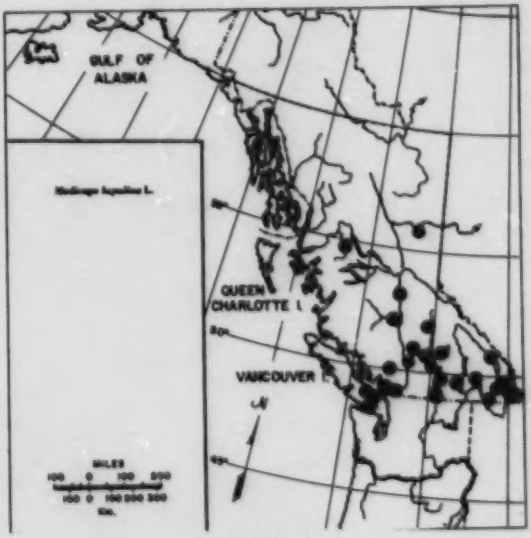
2. *Medicago falcata* L.—Perennial herb. Stems decumbent or erect to 60 cm, usually more or less strigillose. Leaflets less than 15 mm long, linear-lanceolate, emarginate, mucronate; stipules lanceolate, acute to acuminate, entire. Racemes up to 25 mm long. Flowers yellow, about 8 mm long, pedicel longer than the calyx tube. Calyx about 3 mm long; teeth lanceolate-acuminate, slightly longer than the tube. Pod pubescent or glabrescent, not spiny, falcate or nearly straight; seeds 2–5.

Sandy or gravelly soil; Eurasia. Adventive, established at a few places in the Interior.

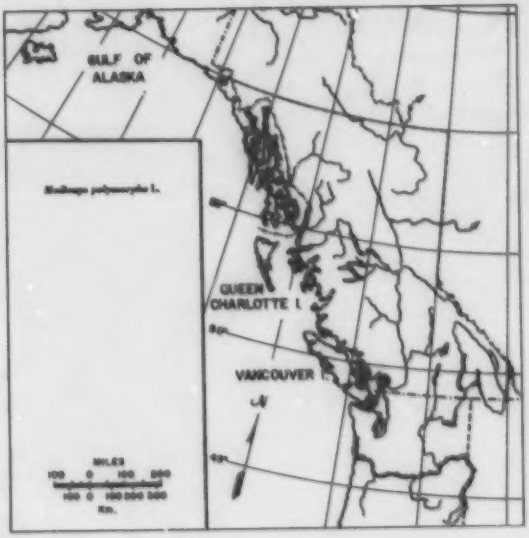
3. *Medicago lupulina* L.—Annual. Stems prostrate or ascending, usually not more than 50 cm long, downy. Leaflets as much as 20 mm long, obovate, apiculate, finely serrate in the upper half; stipules lanceolate, acuminate, half cordate at base, short-toothed. Inflorescence compact, up to 8 mm long; peduncle longer than the petioles. Flowers about 3 mm long, bright yellow. Calyx more or less equal in length to the corolla. Pod kidney-shaped, reticulate, spiralled almost for one complete turn, black; 1-seeded.

Waste ground; Eurasia. Very widely adventive in the Province.



Sickle medic (*Medicago falcata*).

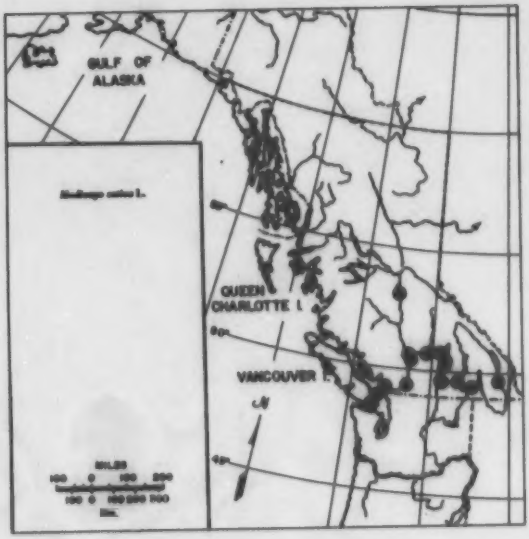
Hop-clover (*Medicago lupulina*).



4. *Medicago polymorpha* L.—Annual. Stems procumbent to nearly erect, up to 50 cm tall, glabrous. Leaflets less than 25 mm long, obovate or obcordate, serrate toward the top, not blotched; stipules ovate-lanceolate, acuminate, deeply laciniate. Inflorescence about 5 mm long; peduncles about equal to the petioles. Flowers usually not more than 5, yellow, about 4 mm long. Calyx slightly shorter, tube and teeth subequal. Pod about 5 mm in diameter, spiralled 1–4 turns, with double row of hooked or curved spines; few seeded. (*M. hispida* Gaertn.).

Sandy and gravelly soil; Eurasia. Established in a few places on southern Vancouver Island and the lower Fraser Valley.

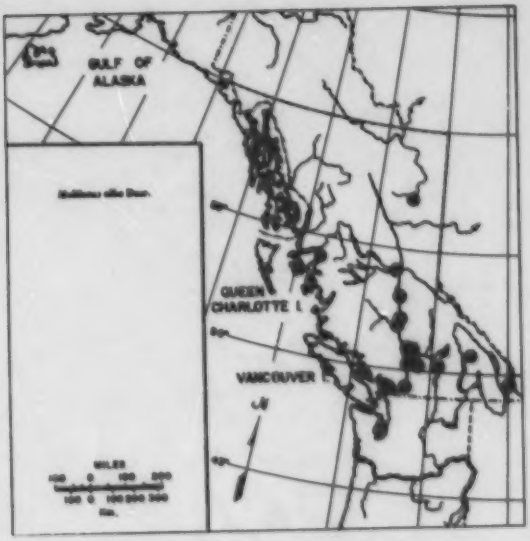
Bur-clover (*Medicago polymorpha*).



5. ***Medicago sativa*** L.—Perennial, deeply rooted. Stems erect or ascending to 8 dm. Leaflets as much as 30 mm long, narrowly obovate, toothed in upper ⅓; stipules linear-lanceolate, acuminate, more or less toothed. Inflorescence to 40 mm long. Flowers 20–80, about 9 mm long, bluish-purple; pedicels shorter than the calyx tube. Calyx somewhat shorter than the corolla. Pod spiralled in 2–3 turns, pubescent or glabrous, strongly reticulate but not armed; seeds 10–20.

Waste ground, roadsides, etc.; Eurasia. Adventive, established in many places.

Alfalfa (*Medicago sativa*).



MELILOTUS MILL. Sweet-clover

Annual, biennial or short-lived perennial herbs. Stems erect, sweet-scented on crushing, glabrous or sparsely pubescent. Leaves pinnately 3-foliolate; leaflets serrulate with veinlets ending in teeth; stipules adnate to the petiole. Racemes slender, spike-like, bracteate. Flowers small, yellow or white. Calyx somewhat campanulate, teeth subequal. Corolla papilionaceous, Stamens diadelphous. Pods short, thick, straight, usually indehiscent, never spiny.

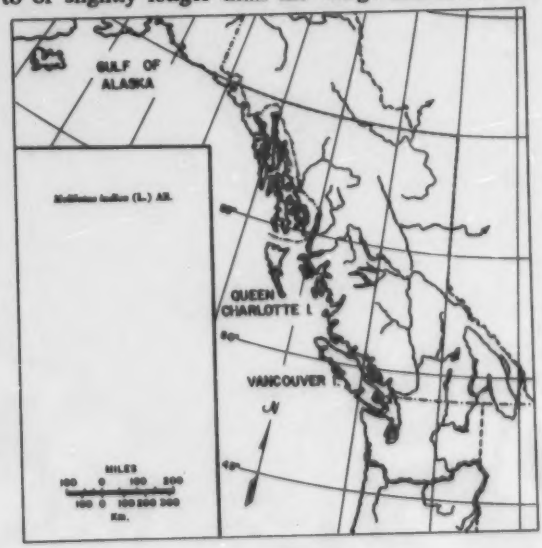
About 25 species in temperate and subtropical Eurasia; Mediterranean.

1. Wings and standard equal, flowers yellow ..... *M. officinalis*
1. Standard longer than the wings, flowers yellow or white.
   Flowers about 5 mm long, white; pod about 5 mm long..... *M. alba*
   Flowers about 2 mm long, pale yellow; pod about 3 mm long *M. indica*

1. ***Melilotus alba*** **Desr.**—Annual or biennial. Stems erect to 2 m freely branched, glabrous to slightly pubescent. Leaflets not more than 2.5 cm long, obovate to oblanceolate or oblong, denticulate except at base, frequently truncate at apex. Racemes as much as 12 cm long; bractlets about 2 mm. Flowers white, about 5 mm long. Calyx-teeth lanceolate subulate. Standard somewhat longer than the subequal wings and keel. Pod about 4.5 mm long, glabrous, reticulate, ovoid, compressed.

Fields and waste places; Eurasia. Freely naturalized, mostly east of the Coast Mountains.

2. ***Melilotus indica*** **(L.) All.**—Annual. Stems erect, as much as 6 dm tall, branched. Leaflets about 2 cm long, cuneate-oblong to obovate, serrate on the upper half only, more or less appressed-pubescent. Racemes slender, usually lax, less than 8 cm long; bractlets linear, very small. Flowers pale yellow, about 2 mm long. Calyx teeth oblong-lanceolate, obtuse. Standard equal to or slightly longer than the wings and keel. Pod about



White sweet-clover (*Melilotus alba*).

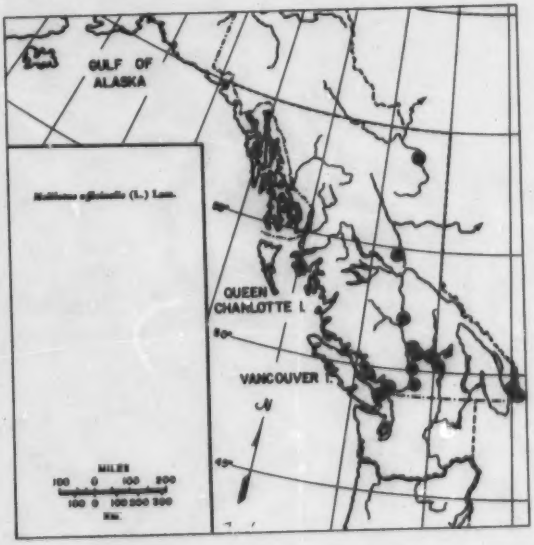
Small-flowered sweet-clover (*Melilotus indica*).

2.5 mm long, glabrous, strongly reticulate, globular-ovoid, olive-green when ripe.

Fields and waste places; southern Eurasia. Known only from Nanaimo.

3. *Melilotus officinalis* (L.) Lam.—Biennial from a strong taproot. Stems erect, up to 15 dm tall, freely branched above, glabrous or sparsely pubescent. Leaflets about 2 cm long, oblong-elliptic, narrowed at both ends, serrulate nearly their entire length. Racemes slender, lax, as much as 9 cm long; bractlets about 2 mm long. Flowers yellow, 6 mm long or less. Calyx-teeth lance-subulate. Standard and wings equal to or longer than the keel. Pod about 4 mm long, glabrous, markedly transverse rugose, brown when ripe.

Fields and waste places; Eurasia. Established in many places in the Interior, rare at the Coast.



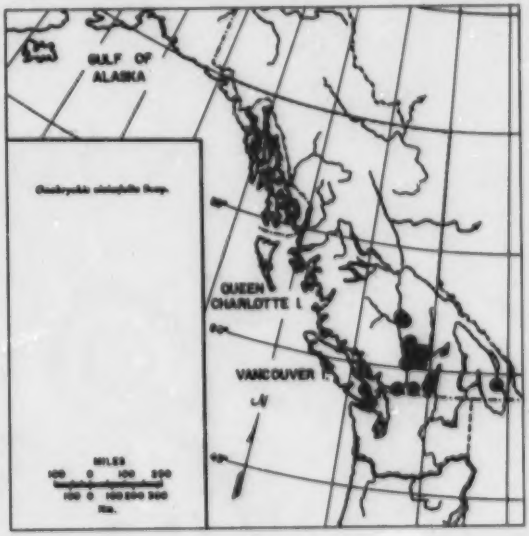
6 Yellow sweet-clover (*Melilotus officinalis*).

ONOBRYCHIS MILL. Saintfoin

Perennial herbs or shrubs. Leaves odd-pinnate; leaflets numerous, entire; stipules membranous. Inflorescence racemose, bracteate. Flowers papilionaceous, white, pink, or purple. Calyx campanulate. Wings much shorter than the banner or keel, keel obliquely truncate. Stamens 10, monodelphous but the upper free at base; filaments not dilated. Pod indehiscent, often spiny or tubercled, 1- or 2-seeded.

About 120 species, largely Mediterranean, southern Europe and western Asia.

***Onobrychis viciifolia* Scop.**—Herbaceous perennial. Stems erect to 60 cm more or less pubescent. Leaflets 6–12 pairs, 1–3 cm long, obovate or linear-oblong, mucronate, petiolate; stipules ovate-acuminate, scarious. Racemes dense, about 50-flowered; peduncles stout, longer than the leaves. Flowers pink or red, about 12 mm long. Calyx teeth subequal, subulate, tube lanate. Wings



Saintfoin (*Onobrychis viciifolia*).

about half the length of the calyx. Pod about 7 mm long, strongly reticulate, pubescent, tubercled on lower margin (*O. sativa* Lam.).

Roadsides and waste ground; native of southwestern Eurasia. Naturalized from Williams Lake south through the Okanagan and Nicola Valleys, and on southeast Vancouver Island.

OXYTROPIS DC. Crazyweed

Perennial herbs with stout, woody taproot and much-branched crown, usually acaulescent or nearly so. Leaves odd-pinnate, mostly basal; stipules more or less adnate to the petioles. Flowers papilionaceous, racemose at the ends of scape-like peduncles. Calyx campanulate with 5 subequal teeth. Petals white or creamy to purplish; banner erect, ovate or oblong; wings oblong, usually exceeding the keel; keel produced into a slender straight or curved beak. Stamens 10, diadelphous. Pods sessile or stipitate, membranous to leathery, 1-celled or commonly more or less 2-celled by intrusion of the upper suture.

About 300 species of North America and Eurasia, some are poisonous to live stock.

BARNEBY, R. C. A revision of the North American species of *Oxytropis*. Proc. Calif. Acad. Sci. IV, **27**:177–312, 1952.

1. Stipules scarcely adnate to the base of the petiole; pods pendulous; plants often with short, leafy stems ..... *O. deflexa*

1. Stipules adnate through half their length or more (or at least through 4 mm) to the enlarged, scarious, or chartaceous bases of the petioles; pods erect or spreading.

   2. Leaflets all scattered or opposite, none geminate or fascicled at the same point on one side of the rachis.

      3. Racemes 1- to 5-flowered, subcapitate at anthesis and scarcely elongated in fruit; corolla (except for rare albino individuals) purple or violet, never buff or yellow.

         4. Pod ovoid, ventricose-inflated, stipitate; mostly alpine..... ..... *O. podocarpa*

         4. Pod ellipsoid to oblong-cylindroid, not more than tumid, sessile or nearly so; plants of high latitudes.

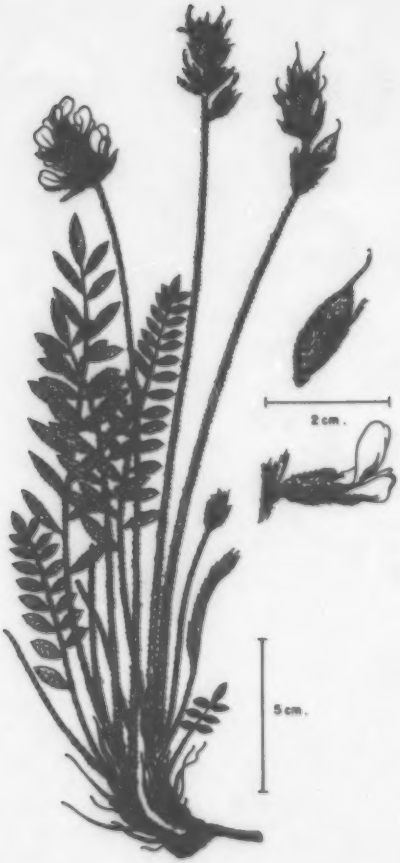
            Pod 17–35 mm long, bilocular or nearly so, the septum at least 1.5 mm broad; petals ample, the standard 7–12 mm, the wings 45 mm wide ..... *O. nigrescens*

Pod about 15 mm long, unilocular, the septum obsolete or nearly so; petals narrower, the standard less than 7 mm, the wings less than 3 mm wide ..... *O. scammaniana*

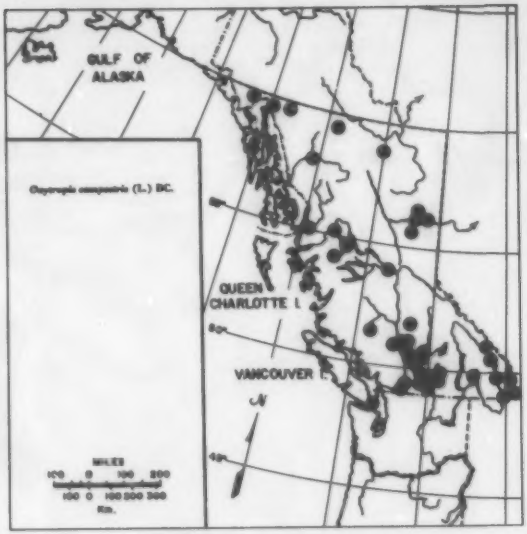
3. Racemes 6- to many-flowered or, if occasionally less, the petals yellow, yellowish-white, or white; axis of the raceme nearly always elongating in fruit.
   5. Stipules purplish-chestnut, chartaceous, margins of free blades with clavate processes mixed with bristly cilia; plants of high latitudes ..... *O. maydelliana*
   5. Stipules pallid, whitish, greenish, or straw-coloured.
      7. Herbage, calyx, and pod more or less viscid-glandular, calyx teeth and pod often glandular-verrucose; bracts nearly always glabrous dorsally ..... *O. viscida*
      7. Herbage, calyx, and pod not glandular; bracts pilose dorsally.
         Pod membrano-chartaceous, not rigid at maturity; corolla mostly small with narrow petals, the wings not conspicuously dilated upward, about 3.0–4.5 mm wide near the apex ..... *O. campestris*
         Pod coriaceous and rigid at maturity; corolla commonly more ample, the wings conspicuously dilated upward and at least 5 mm wide at apex ..... *O. sericea*

2. Leaflets, at least on some leaves, geminate or fascicled at the same point on one side of the rachis.
   8. Herbage glandular; bracts, calyx-teeth, and pod glandular-verrucose ..... *O. viscida*
   8. Herbage not glandular; verrucæ absent.
      All leaflets bearing predominately paired or whorled leaflets, solitary leaflets few or none; scapes and petioles villous-pilose with fine, spreading hairs, at least at base; stipules thin and fragile; corolla purple ..... *O. splendens*
      Primary leaves with solitary, scattered or opposite leaflets only; scapes and peduncles ascending or appressed-pilose; stipules firm; petals white or yellowish-white ..... *O. campestris*

1. *Oxytropis campestris* (L.) DC. — Perennial, densely cæspitose, very variable in stature and pubescence. Leaflets 7 to numerous, scattered, opposite, sometimes geminate; stipules membranous, glabrous to pilose dorsally, margins naked or ciliate (with club-shaped processes in addition on northern forms). Peduncles decumbent to erect, usually less than 30 cm long; racemes 5- to 30-flowered, capitate to oblong; bracts pilose dorsally. Calyx loosely pilose with pale greyish-brown or mixed hairs, tube about



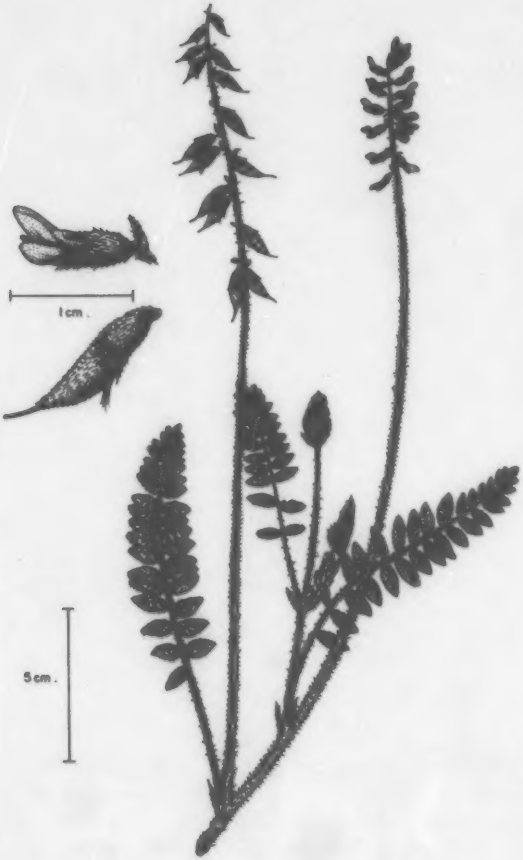
Field crazyweed (*Oxytropis campestris*).



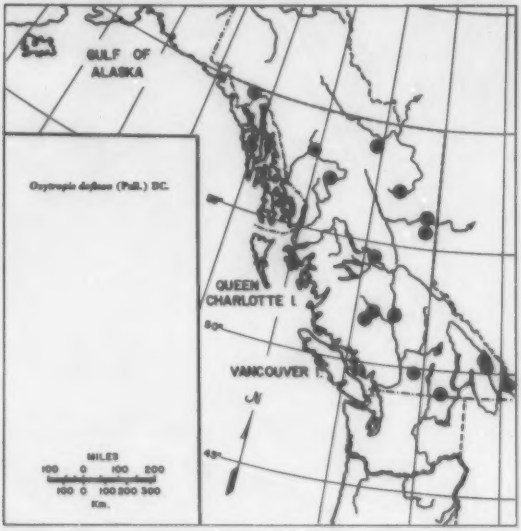
6 mm long, teeth considerably shorter. Corolla white or yellowish-white (ours); standard up to 20 mm long; wings shorter, oblong, truncate, blades usually not much dilated upwards; keel about as long as the wings. Pods not more than 16 mm long, sessile or nearly so, strict or more or less spreading, oblong to obovoid-ellipsoid, valves membranous-chartaceous, shortly and finely pilose (*O. cusickii* Greene).

Open montane situations; circumboreal; south in the Cordillera to Oregon and Colorado. In one form or another very widely spread in the Province, particularly in the Interior.

2. *Oxytropis deflexa* (Pall.) DC.—Perennial with a well-developed taproot, usually caulescent. Stems flexuous with 1–7 internodes, up to 2 dm long; herbage loosely villous-pilose to thinly subappressed-pilose, canescent or green. Leaves up to 20 cm long; leaflets 15–41 in opposite or subopposite pairs, ovate to lance-oblong, not more than 25 mm long, loosely pilose above and below or glabrous above; stipules subherbaceous, pale green or purple, lanceolate, adnate to petioles for not more than 3 mm, more or



Pendent-pod crazyweed (*Oxytropis deflexa*).

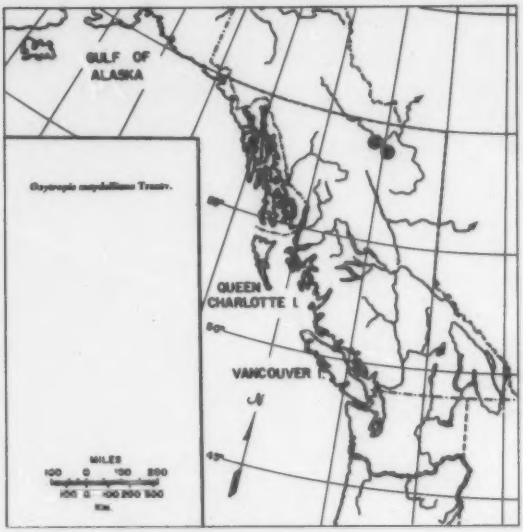


less pilose dorsally. Penduncles erect, up to 30 cm long; racemes 5- to 26-flowered, compact, spike-like, axis up to 15 cm long in fruit; bracts submembranous, 2–7 mm long, linear to lance-oblong. Flowers bluish-purple or pale, at first more or less erect but soon deflexed and commonly secund. Calyx pilose, teeth and tube more or less subequal. Standard not reflexed, 5–9 mm long; wings and keel nearly as long. Pod 5–15 mm long, oblong ellipsoid to linear-oblong, finely pilose, 1-celled.

Meadows and streamsides; Siberia and North America, south to Oregon, Colorado, and New Mexico. Scattered through the Interior, particularly in the Rocky Mountain region.

3. *Oxytropis maydelliana* Trautv.—Cæspitose from stout, many-branched caudex, branches covered with marcescent stipules and leaf bases. Leaflets 11–17, up to 13 mm long, ovate to lanceolate, elliptic or oblong, sparingly pilose; stipules lanceolate, usually longer than the leaflets, yellowish-brown soon becoming purplish-chestnut, stiff, chartaceous, glabrous dorsally, blade deltoid to lance-caudate, hispid-ciliate with yellowish hairs intermingled with

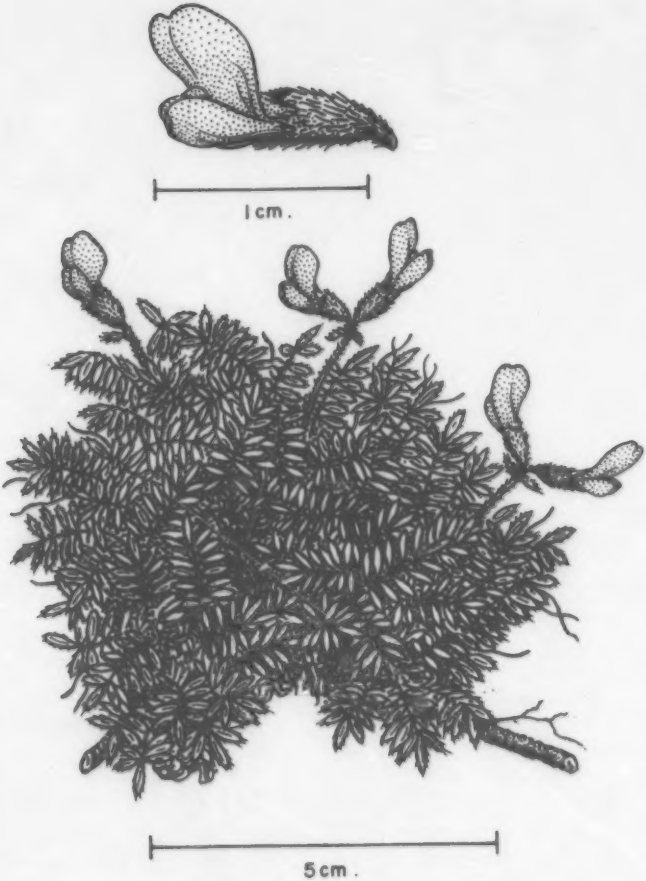
Maydell's crazyweed (*Oxytropis maydelliana*).



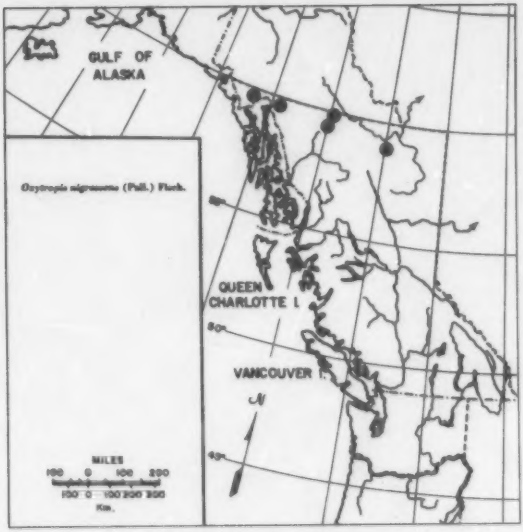
a few club-shaped processes. Peduncles erect, thinly villous-hirsute; racemes subcapitate, 5- to 10-flowered. Calyx shaggy pilose with dark or mixed hairs, teeth subdeltoid, much shorter than the tube. Corolla yellow; standard oblanceolate, about 16 mm long; wings shorter, oblong or oblong-triangular; keel slightly shorter than the wings. Pods ovoid to ellipsoid, tumid, up to 13 mm long, sulcate dorsally, valves more or less chartaceous, finely pilose with dark and pale hairs.

Arctic and subarctic shores; Arctic North America to east Asia, south to about Lat. 59°N. Known in British Columbia only from Summit Pass region.

4. *Oxytropis nigrescens* (Pall.) Fischer—Densely cæspitose from branched caudex; caudex clothed with remains of stipules. Herbage hirsute, sometimes densely so, hairs shining. Leaflets 7–15, less than 10 mm long, commonly crowded, ovate to linear-elliptic; stipules firmly membranous, pale, more or less pilose dorsally when young, often glabrate in age, blade deltoid-ovate to long-acuminate. Peduncle less than 4 cm, erect or ascending;



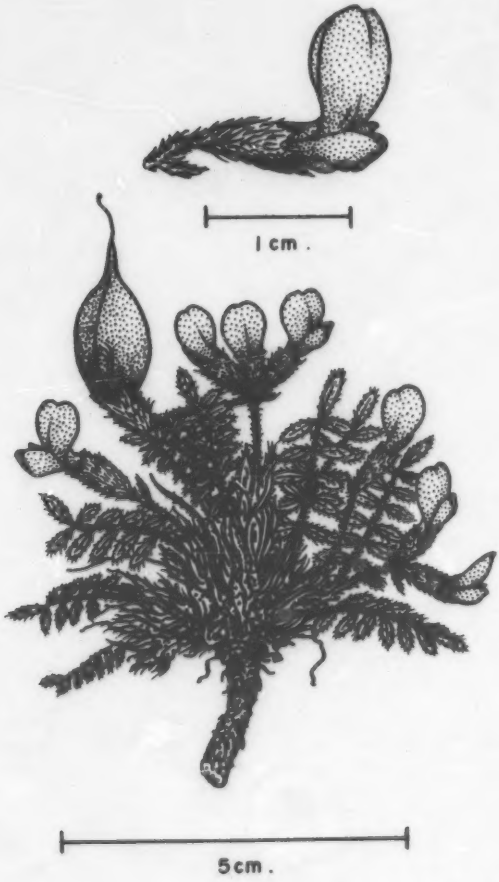
Blackish crazyweed (*Oxytropis nigrescens*).



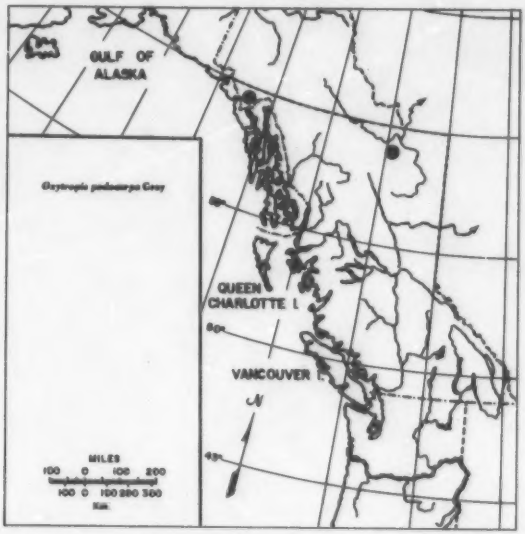
racemes usually only 1- or 2-flowered, flowers spreading. Calyx shaggy hirsute, usually with black hairs; tube longer than the lanceolate teeth. Corolla bright purple, exceptionally white; standard 14–20 mm long, blade suborbicular-obcordate; wings shorter and slightly longer than the keel. Pods spreading, subsessile, not more than 3.5 cm long, narrowly oblong-ellipsoid, acuminate at both ends, nearly terete, valves chartaceous, finely pilose to densely villous with mixed pale and dark hairs, or largely dark hairs (*O. pygmæa* (Pall.) Fernald).

Rocky places, often among lichens and mosses, tundra; Arctic and subarctic North America to northern British Columbia. Not known with us south of Lat. 59°N.

5. *Oxytropis podocarpa* Gray—Cæspitose, caudex covered with persistent stipules and marcescent leaf bases. Herbage pilose-hispidulous, commonly becoming greenish at maturity. Leaves ascending and spreading, up to 4 cm long, petioles slender, leaflets 9–13; leaflets 5–10 mm long, linear-lanceolate, often involute, falcate, both surfaces usually greenish, sparingly hirsute, margins



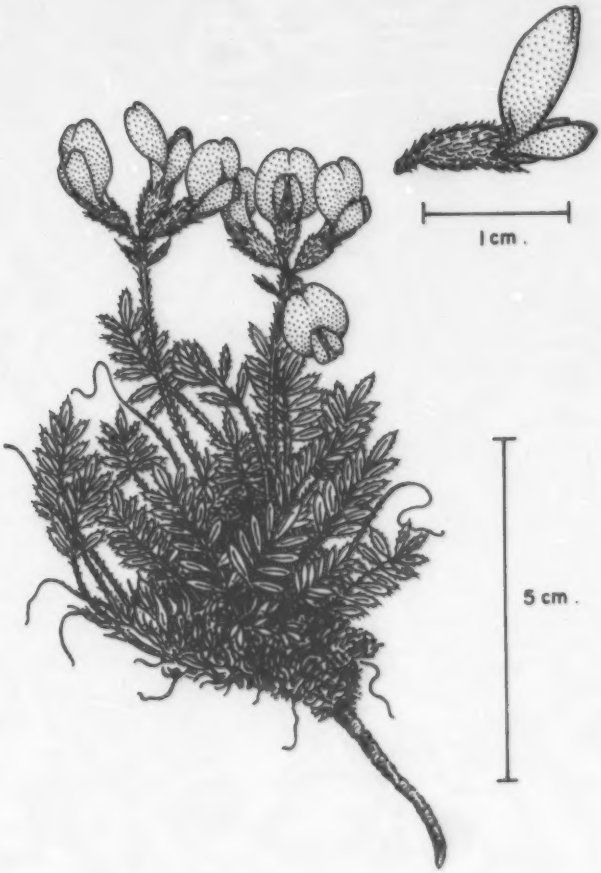
Stalked-pod crazyweed (*Oxytropis podocarpa*).



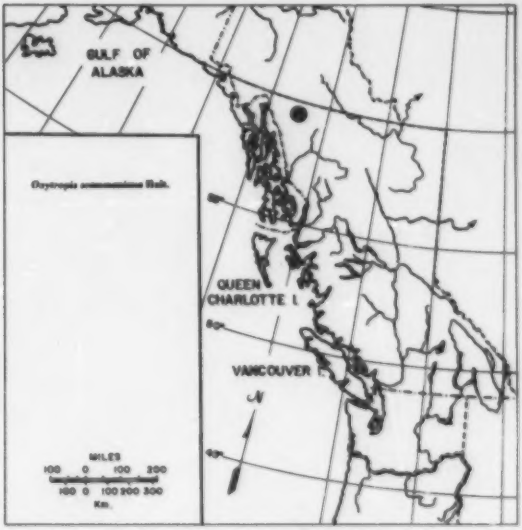
more copiously so; stipules adnate for about three quarters their length, ovate-deltoid to lanceolate, bristly ciliate or the cilia at length deciduous. Racemes subcapitate, 1- to 3-flowered, flowers spreading on short, slender pedicels. Calyx 7–10 mm long, thinly pilose, usually with mixed short, dark and longer, paler hairs; tube campanulate, often narrowed to obconic base, teeth deltoid about half the length of the tube or less. Corolla purple; standard with suborbicular blade about 7 mm wide; wings slightly longer than the keel. Pods about 2 cm long, ovoid-ellipsoid, bladderly inflated, short stipitate, valves thinly chartaceous, short pilose.

Rock alpine sites; Rocky Mountains from southwestern Northwest Territories to Colorado, east along Arctic coast to Labrador. Known only from extreme northern British Columbia.

6. *Oxytropis scammaniana Hultén.*—Densely, or more often loosely, cæspitose, caudex branches ranging from quite short to 8 cm long. Leaves 2–6 cm long; petioles with a few scattered hairs; stipules pale or faintly purple-tinged, up to 13 mm long, glabrous or nearly so dorsally, free blades ovate to lanceolate,

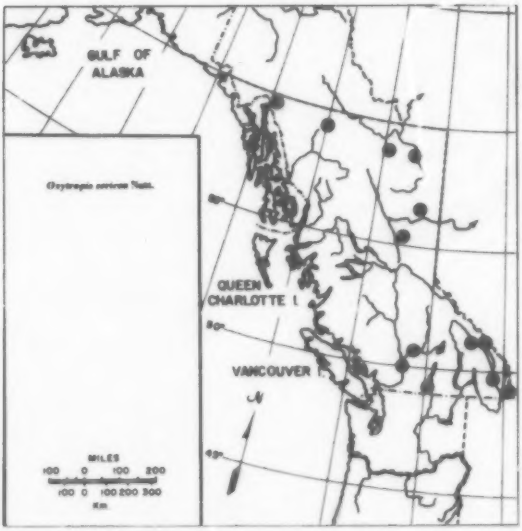


Scamman's crazyweed (*Oxytropis scammaniana*).



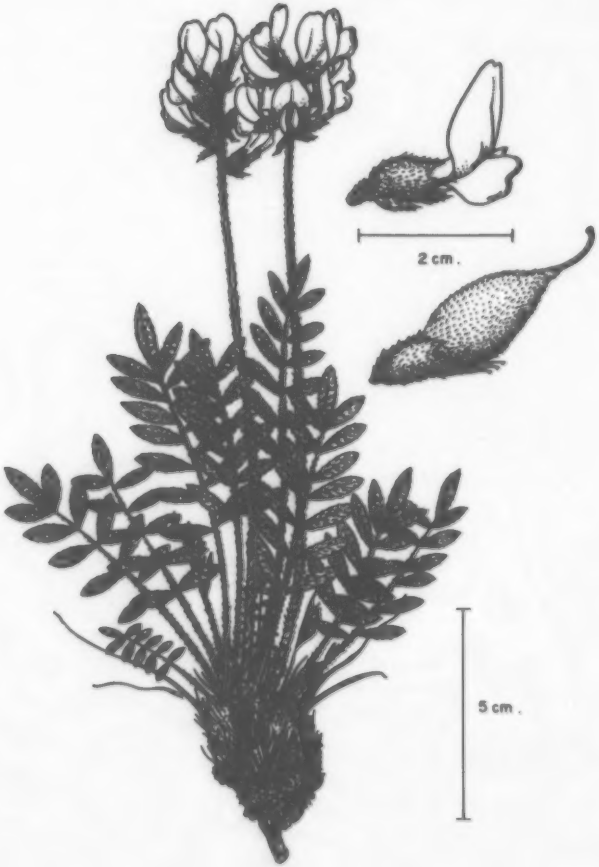
shorter than the adnate portion, ciliate when young with white or a few brownish bristles, cilia later deciduous; leaflets 9–13, sparingly pilose beneath, thinly pilose or glabrate above, narrowly ovate to linear-lanceolate. Scapes up to 6 cm long, erect or ascending, sparingly appressed-pilose, greyish-brown below the raceme, bracts lanceolate, membranous, loosely black-pilose dorsally, racemes subcapitate, 3–4 flowered, axis not elongating in fruit. Calyx 6–7 mm long, shaggy pilose with dark hairs, tube about twice as long as the teeth; corolla purple, drying violet; standard up to 14 mm long, broadly oblanceolate, deeply emarginate; wings somewhat shorter; keel shorter than the wings. Pods membranous, sessile, oblong ellipsoid, about 15 mm long, grooved below, black hairy, septum very narrow or lacking.

Stony hillsides in the mountains; eastern Alaska, western Yukon, and northern British Columbia. Known with us only from the Teslin Lake area.

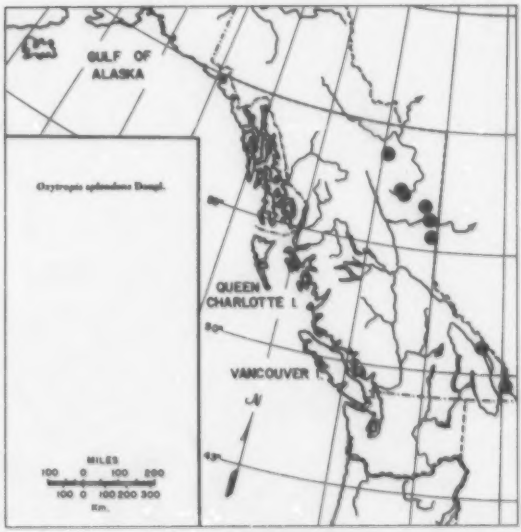


7. ***Oxytropis sericea*** **Nutt.**—Cæspitose from much-branched caudex, caudex branches clothed with marcescent stipules and leaf bases. Herbage silky-pilose. Leaflets 11–15, 7–22 mm long, opposite or scattered, ovate-oblong to lanceolate, rachis about twice the length of the petiole; stipules membranous, adnate for about ¾ their length, free portion often strongly hispid-ciliate but sometimes with only a few apical hairs. Peduncles longer than the foliage; racemes 6- to 27-flowered, dense in anthesis, commonly elongating in fruit. Calyx silky-pilose with mixed pale and dark hairs, pale hairs sometimes lacking; tube about 7 mm long, teeth about ¼ the length of the tube, nigrescent. Corolla pale yellow throughout; wings and keel subequal, shorter than the banner. Pod 16–25 mm long, leathery, short pubescent with either mixed or wholly black hairs.

Gravelly slopes, often subalpine; British Columbia to Manitoba, south to Nevada, Utah, New Mexico, Oklahoma, South Dakota, Nebraska, and Kansas. In the Rocky Mountains south from almost Lat. 60°N.

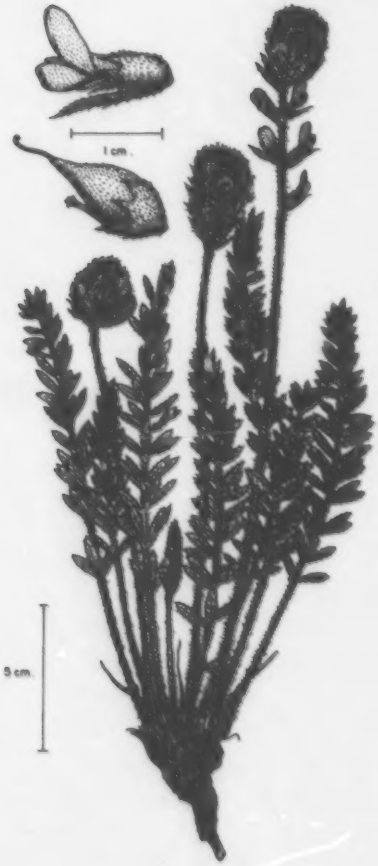


Silky crazyweed (*Oxytropis sericea*).

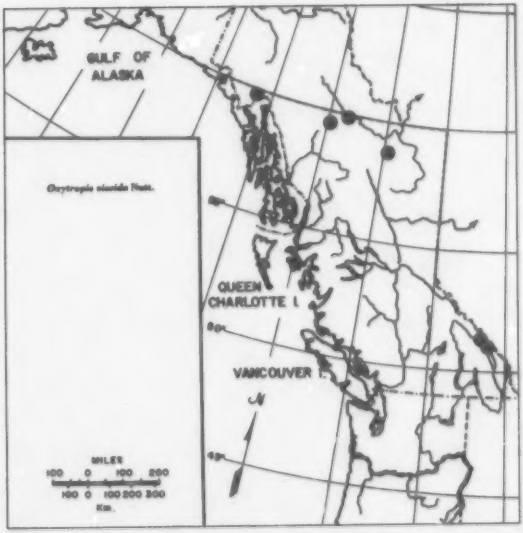


8. ***Oxytropis splendens*** **Dougl.**—Cæspitose from branched caudex. Herbage copiously silky-villous throughout. Leaflets numerous in fascicles of 2–4, 3–20 mm long, elliptic to lanceolate, usually canescent on both surfaces; stipules membranous, adnate for about ¾ of their length, free blades deltoid-acuminate, silky-pilose dorsally. Peduncles slightly longer than the leaves; racemes 12- to 35-flowered, dense in anthesis, axis elongating in fruit. Calyx silky-villous, about two-thirds the length of the corolla, teeth linear-lanceolate, obtuse, about one-third the length of the tube. Corolla rose-purple, drying violet; standard slightly longer than the wings and keel. Pod 10–17 mm long, short stipitate, ovoid–ellipsoid or oblong sulcate along both sutures, more or less cordate in sections through instrusion of the upper suture.

Gravel bars, meadows, and open grasslands; Alaska to northern Ontario and northern Minnesota, south along the Rocky Mountains to New Mexico. Found in the Peace River region and southern Rocky Mountains.

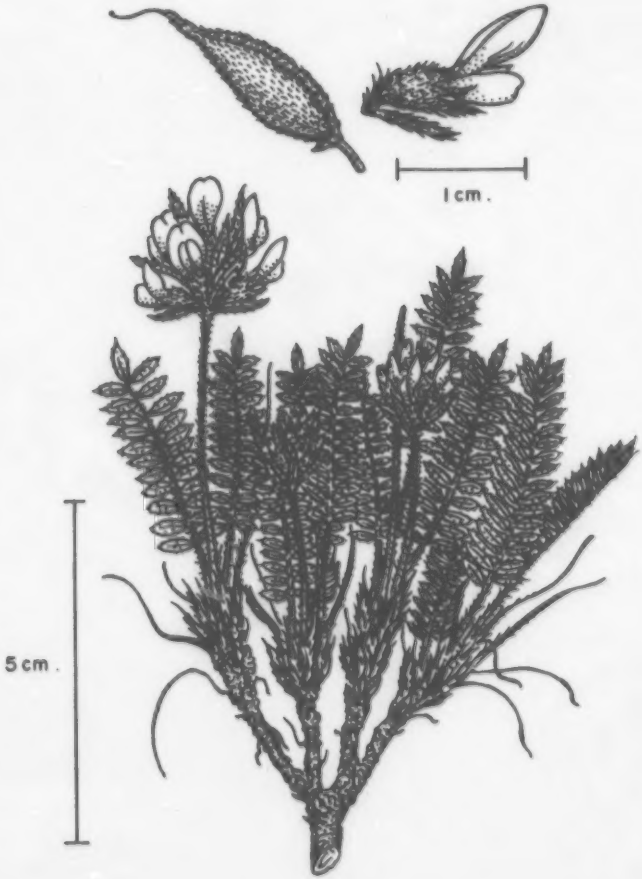


Showy crazyweed (*Oxytropis splendens*).



9. *Oxytropis viscida* Nutt. — Cæspitose from a branched caudex. Herbage pilose-hirsute, viscid throughout with wartlike glands. Leaflets 25–39, up to 22 mm long, subopposite but rarely geminate, oblong-lanceolate, glabrate, often warty; stipules membranous, adnate for more than half their length, blade deltoid to caudate- acuminate, margins ciliate. Racemes 3- to 20-flowered, compact, elongating to as much as 7 cm in fruit. Calyx pilose with long, pale hairs or short, dark hairs, about two-thirds as long as the corolla, teeth linear about half the length of the tube, prominently warty. Corolla whitish, sometimes with a lilac or purplish spot on the keel. Pod 10–15 mm long, dark hairy, prominently warty, upper suture deeply intruding (*O. leucantha* Pallas).

Alpine areas, talus slopes, and dry hillsides; Alaska to Quebec, south to California, Colorado, Minnesota, and Ontario. Known from northern British Columbia and the southern Rocky Mountain region.



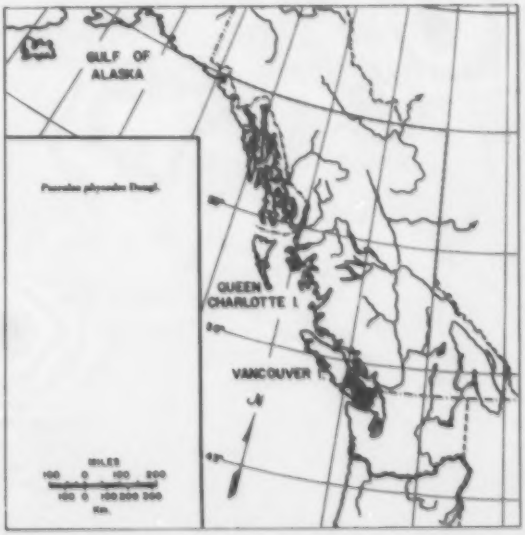
Sticky crazyweed (*Oxytropis viscida*).

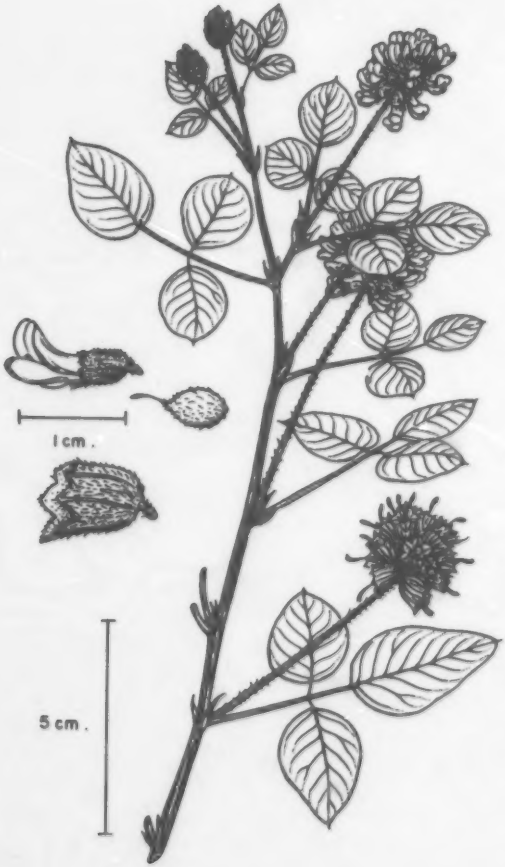
PSORALEA L. Scurf-pea

Herbaceous perennials, foliage scented and furnished with dark glands or transparent dots. Leaves alternate, 1- to 5-foliolate; stipules large. Inflorescence of peduncled spikes or racemes. Flowers papilionaceous; purple, blue, pink, or white. Teeth of the calyx more or less equal or the lower longer. Standard ovate to orbicular, longer than the wings and keel; wings oblong or falcate; keel obtuse. Stamens 10, mono- or diadelphous. Pods sessile or short stipitate, more or less equal to the calyx in length, ovoid, indehiscent; 1-seeded.

About 130 species, mostly of tropical and subtropical regions.

Psoralea physodes **Dougl.**—Perennial with a creeping rootstock. Stems erect to 8 dm, glabrous or sparsely pubescent, mostly with black hairs, prominently striated, sparingly branched. Leaflets 3, ovate to broadly ovate-rhombic, 2–6 cm long, mucronate, sparsely puberulent, minutely punctate dotted; petioles about as long as the leaflets; stipules linear. Peduncles much longer than





Scurf-pea (*Psoralea physodes*).

the short, dense 15- to 20-flowered raceme, rachis and peduncle villous-pubescent with black hairs. Calyx black hairy, glandular dotted, about 4 mm long in flower, 7 mm long in fruit, teeth triangular-acuminate, equalling or shorter than the tube. Corolla about 11 mm long, ochroleucous; standard oblanceolate, equal in length to the wings; keel purple-tipped. Pod about 6 mm long, compressed-ovoid, sparsely dark hairy.

Open woods; southwest British Columbia to California. Known only from southern Vancouver Island.

THERMOPSIS R.Br. Golden-banner

Perennial herbs with sheathing scales at the base. Stems stout arising from a woody rootstock. Leaves 3-foliate, alternate; stipules large, leaf-like. Inflorescence racemose. Flowers few to numerous, pea-like; floral bracts conspicuous. Calyx campanulate, bilabiate (through fusion of the 2 upper lobes). Corolla yellow (in ours); standard nearly orbicular, equalling the oblong wings; keel nearly straight. Pod elongated, linear, usually flat, somewhat woody, many-seeded.

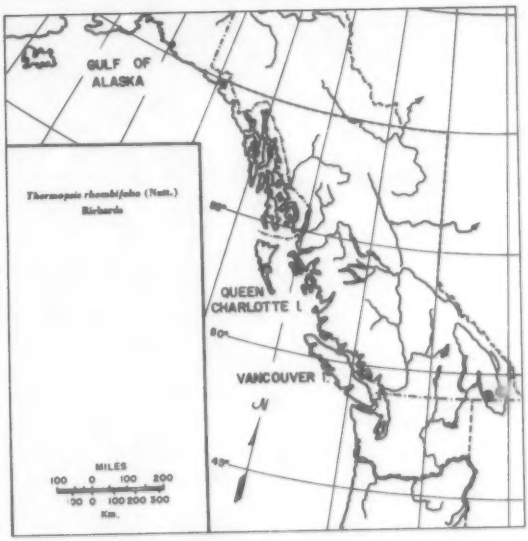
A small genus of about a dozen species of North America and Asia.

LARISEY, M. M. A. A revision of the North American species of Thermopsis. Ann. Mo. Bot. Gard. **27**:245–258. 1940.

Thermopsis rhombifolia (Nutt.) Richards. — Rootstock creeping. Stems mostly unbranched, erect or ascending to 4 dm. Leaves with large ovate-cordate stipules, digitately 3-foliate; leaflets obovate to elliptic, about 2.5 cm long, entire, strigose to nearly glabrous. Raceme short, crowded. Corolla golden yellow, up to 2 cm long. Pods as much as 7 cm long at maturity, flat, spreading, usually recurved, mostly silky.

Grasslands, especially in sandy soil; extreme southeastern British Columbia to Alberta, south to North Dakota and Colorado. Known with us only from near Erickson.

Round-leaved golden-banner (*Thermopsis rhombifolia*).



TRIFOLIUM L. Clover, Trefoil

Annual or perennial, taprooted or rhizomatous, usually low-growing herbs. Leaves pinnately or palmately trifoliate; stipules membranous to foliaceous. Flowers sessile or shortly pedicelled in rather dense racemose, often involucrate, peduncled heads. Flowers white, yellow, pinkish to red, or purple. Calyx persistent, teeth 5, more or less equal or rarely the lower one much longer than the others. Corolla papilionaceous, petals usually persistent; standard little reflexed from the wings and keel; wings longer than the keel, claws of both adnate to the staminal tube. Stamens 10, diadelphous. Pod indehiscent, opening by 2 valves, more or less enclosed in the calyx and often covered by the persistent standard; 1- to 10-seeded.

About 300 species in temperate and subtropical regions, mainly North Temperate, especially western North America.

1. Heads not involucrate.
   2. Annual.
      3. Flowers pedicellate, reflexed in age; calyx glabrous except in *T. bifidum*.

4. Calyx 5-nerved; flowers yellow.
5. Heads 8–12 mm long; standard dilated, not folded over the pod.
Stipules half-ovate ..... *T. campestre*
Stipules linear-oblong ..... *T. aureum*
5. Heads 4–6 mm long; standard not dilated, folded over the pod ..... *T. dubium*
4. Calyx 10-nerved; flowers purple ..... *T. bifidum*
3. Flowers sessile, not reflexed in age; calyx densely villous.
6. Heads cylindrical; flowers red, pink, or white; introduced species.
Corolla pink or white, 2–3 mm long, about half as long as the calyx ..... *T. arvense*
Corolla red, 9–15 mm long, longer than the calyx ..... *T. incarnatum*
6. Heads globose to oblong-ovoid; flowers purple; native species ..... *T. macraei*
2. Perennial.
7. Peduncles axillary.
Stems ascending; stipules with long, acuminate tips; calyx-teeth subulate, nearly twice as long as the tube ..... *T. hybridum*
Stems creeping, rooting as the nodes; stipules with short, subulate points; calyx-teeth narrowly triangular, about half as long as the tube ..... *T. repens*
7. Peduncles terminal or subterminal.
Heads long-peduncled; corolla white, slightly longer than the calyx ..... *T. longipes*
Heads sessile in the uppermost leaves; corolla red, about twice as long as the calyx ..... *T. pratense*
1. Heads involucrate.
8. Flowers not inflated; involucral bracts united.
9. Involucre cup-shaped.
10. Lobes of the involucre toothed.
Calyx-teeth with elongated. simple or forked, awn-like apices ..... *T. cyatheriferum*
Calyx-teeth ciliate, short triangular, abruptly apiculate ..... *T. microdon*
10. Lobes of the involucre entire; heads small, pubescent ..... *T. microcephalum*
9. Involucre rotate.
11. Perennial; heads large, many-flowered, purple *T. wormskjoldii*
11. Annual.
12. Calyx 10-nerved ..... *T. oliganthum*

12. Calyx 20–25-nerved.
    Involucre distinctly lobed, the lobes laciniate-toothed; calyx-teeth subulate, entire ..... *T. variegatum*
    Involucre unevenly laciniate-toothed but not lobed; calyx-teeth abruptly attenuate, usually with 1 or 2 lateral teeth ..... *T. tridentatum*

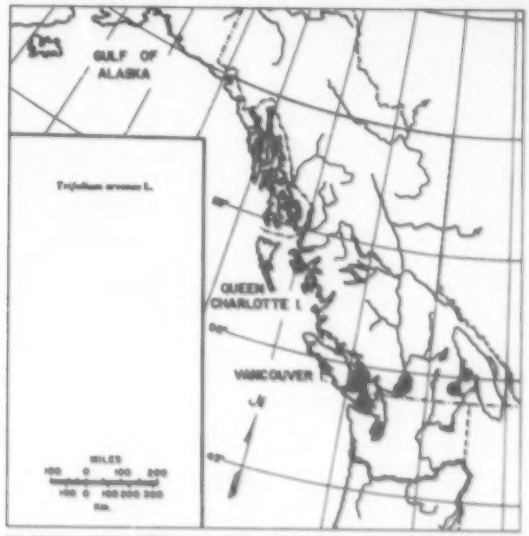
8. Flowers inflated in age; involucral bracts distinct, sometimes reduced.
    Flowers large, 10–25 mm long, cream or yellowish ..... *T. fucatum*
    Flowers small, 3–6 mm long, red-purple ..... *T. depauperatum*

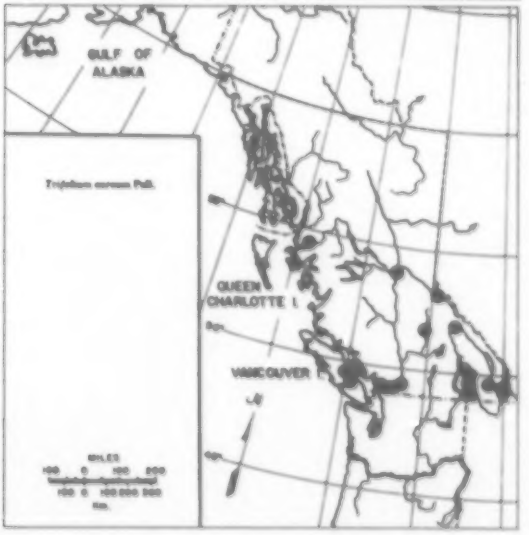
1. *Trifolium arvense* L.—Soft, hairy annual. Stems erect or ascending to 25 cm, usually with spreading branches. Leaflets 10–25 mm long, narrowly obovate-oblong; petioles shorter than the leaflets; stipules ovate with long, setaceous tips. Inflorescence terminal or auxiliary, cylindrical, softly pubescent, not involucrate; peduncles equalling or slightly longer than the leaves. Flowers white or pink. Calyx tube campanulate, strigose-plumose, weakly ribbed, throat glabrous; teeth setaceous, long ciliate, about twice as long as the tube. Corolla about 5 mm long, about half as long as the calyx. Pod membranous, indehiscent, about 1.5 mm long; 1-seeded.

Open, sandy places and waste ground; Europe. Locally established, mostly on Vancouver Island and lower Fraser Valley.

2. *Trifolium aureum* Poll.—Pubescent to glabrous annual. Stems erect or ascending, up to 5 dm long. Leaflets 15–30 mm long, oblong-elliptic to oblanceolate, serrulate in upper half; stipules linear-oblong, acuminate, adnate for about two-thirds their length; petioles shorter than the stipules. Racemes axillary, many-flowered, not involucrate; peducles longer than the leaves. Flowers about 5 mm long, yellow, pendulous at anthesis. Calyx glabrous, about half the length of the corolla, upper teeth about half the length of the lower. Standard spreading not folded, much longer than the wings and keel. Pod oblong, about twice the length of the style; seeds 2 (*T. agrarium* of authors).

Waste places, roadsides, etc.; Eurasia. Adventive and widely established south of about Lat. 55°N.


GULF OF
ALASKA
QUEEN
CHARLOTTE I.
VANCOUVER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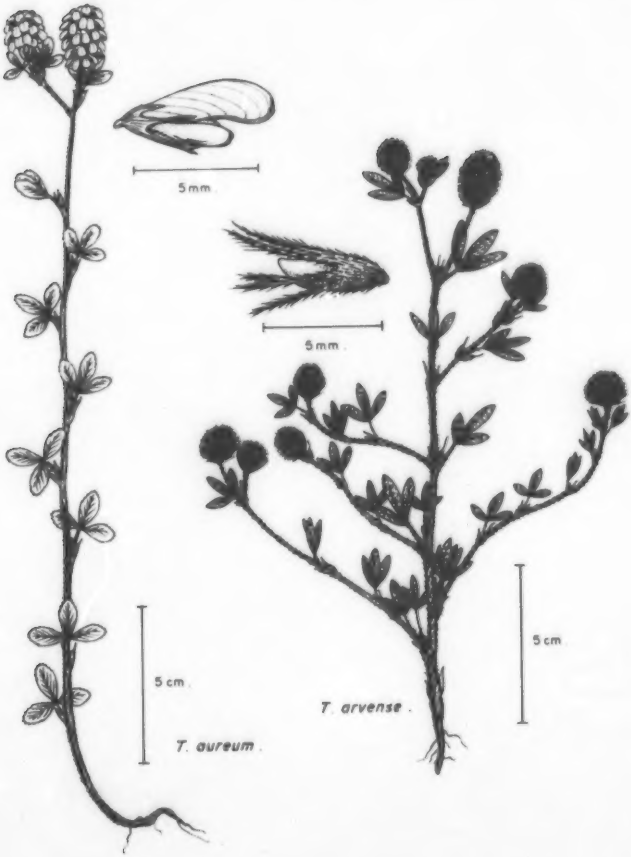
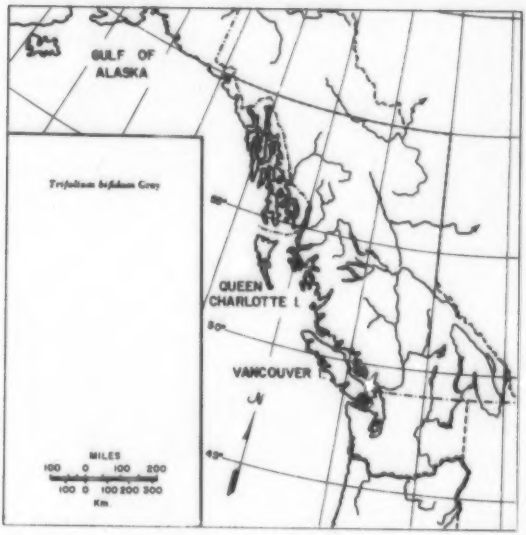
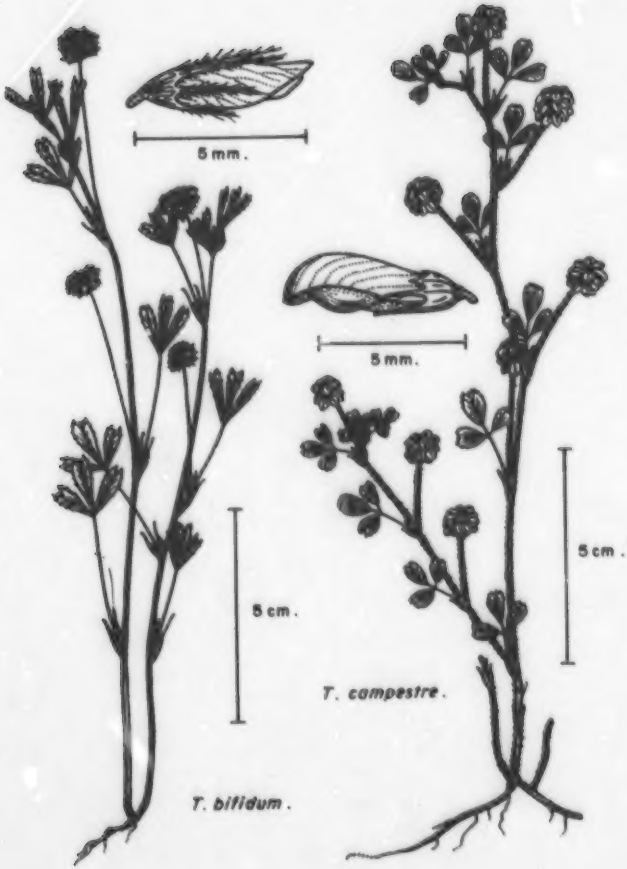


Golden clover (left); Hare's-foot clover (right).

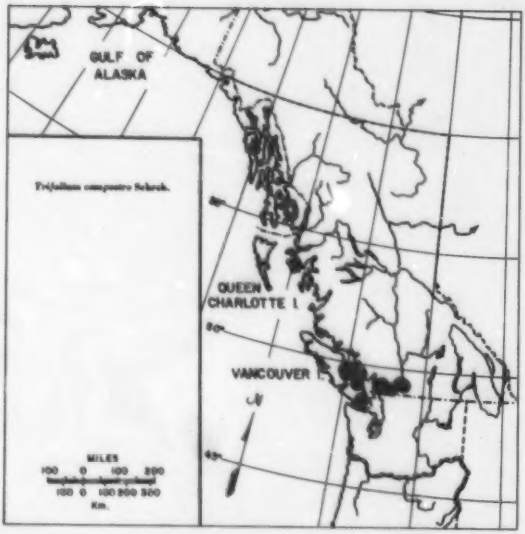


3. *Trifolium bifidum* Gray—Pale green, glaucous annual. Stems very slender, erect or decumbent, up to 35 cm long. Leaves long-petioled; leaflet usually not more than 3 cm long, oblong-elliptic to oblanceolate, obcordate, finely mucronulate, remotely acerose-denticulate for full length; stipules narrow margined with long, acuminate, entire tips. Racemes 10- to 30-flowered, not involucrate; flowers erect at first, later reflexed. Calyx glabrous, tube 10-veined; teeth subulate-setaceous, longer than the tube, upper 2 much the longest. Corolla white, pale rose to purplish. Pod included in the calyx; seeds 1 or 2.

Grassy places; southern Washington to Baja California, west of Cascades. Reported from the Victoria region.

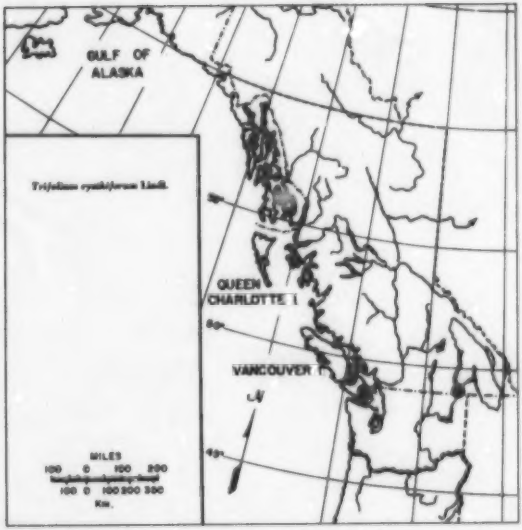


Pinole clover (left); Hop clover (right).



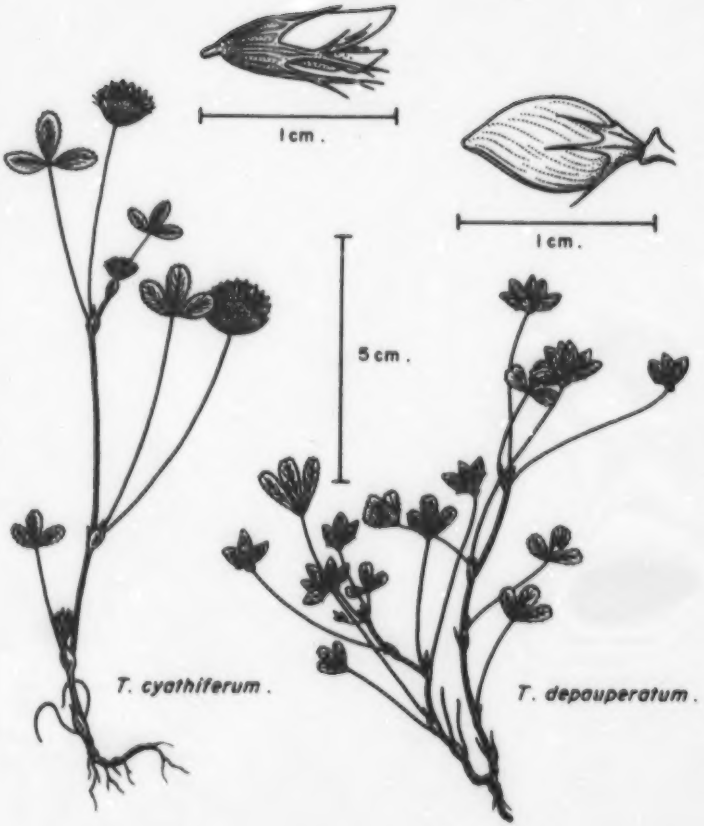
4. *Trifolium campestre* Schreb.—Hairy annual much like *T. aurem* but generally smaller. Stems procumbent or ascending, up to 35 cm long. Leaves pinnately 3-foliate; leaflets about 9 mm long, obovate or obcordate, cuneate, petiolule of terminal leaflet about twice the length of the lateral; petiole about equalling the leaflets and much longer than the stipules; stipules adnate for half their length, ovate, tips triangular, longer than the petioles. Flowers about 5 mm long, yellow, turning light brown. Standard broad, not folded, much longer than the pod; pedicel about half the length of the calyx tube. Pods about 2 mm long, ovoid, several times as long as the style; seeds 1 or 2 (*T. procumbens* of authors).

Grassy places and roadsides; Eurasia, North Africa. Established in many places on Vancouver Island and the lower Fraser Valley.

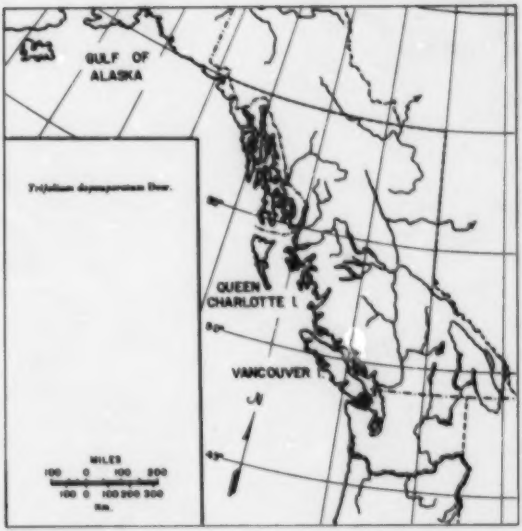


5. *Trifolium cyathiferum* Lindl.—Glabrous annual. Stems decumbent or erect, branching, up to 25 cm long. Leaflets 10–25 mm long, oblong or ovate, minutely spiny denticulate; stipules broad, ovate to lanceolate, scarious, setaceous-serrulate. Racemes long-peduncled; involucre flaring to cup-shaped, scarious, strongly veined, shallowly lobed, finely erose dentate, teeth tipped with short bristles; flowers 5–25. Calyx glabrous, thin membranous, 13- to 20-veined; teeth setaceous, longer than the tube, the lower often forked. Corolla white or purplish, about equalling the calyx. Pod frequently short stipitate; seeds 1 or 2.

Moist, often sandy ground; southern British Columbia to California, east to Idaho, east of Coast Mountains. Rare, known from Rossland, records from Victoria may be introductions.

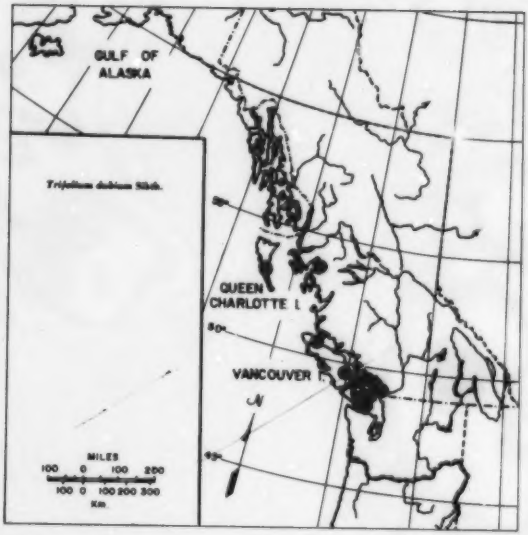


Cup clover (left); Poverty clover (right).



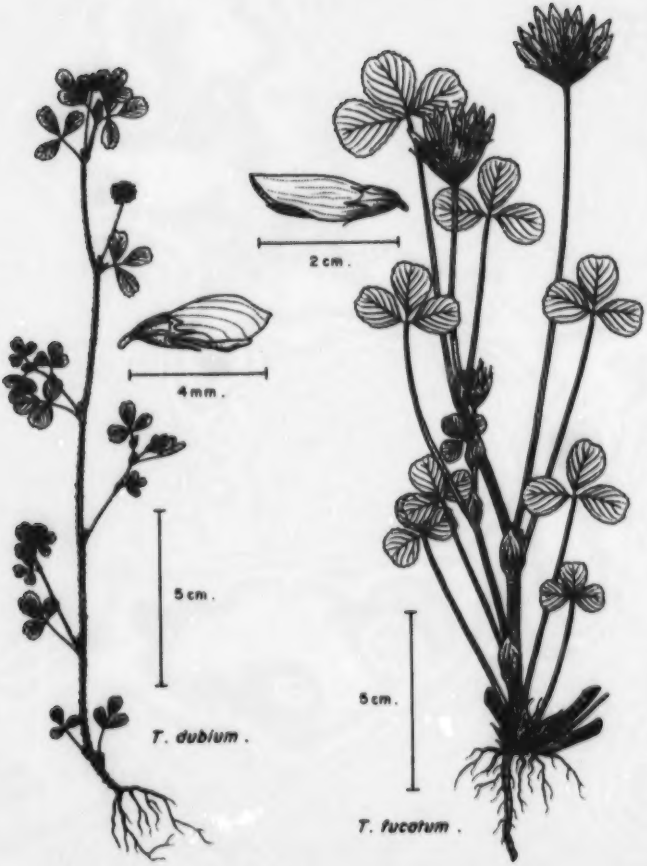
6. *Trifolium depauperatum* Desv.—Glabrous or sparsely glandular, pubescent annual. Stems diffusely branched, up to 3 dm long. Leaflets 6–12 mm long, cuneate-oblanceolate to obcordate, denticulate, truncate or emarginate; stipules short, entire, scarious, acuminate. Racemes 3- to 10-flowered, long pedunculate; involucre minute, glabrous, entire or sometimes 5- to 7-lobed, or lacking. Calyx funnel-form, 5- or 6-nerved; teeth subulate-setaceous, more or less equalling the tube. Corolla white or pinkish-purple; banner large and inflated, nearly as broad as long. Pod more or less stipitate; seeds 1–6.

Wet places; central Oregon to California, probably introduced in Washington and British Columbia. Known only from the vicinity of Victoria.

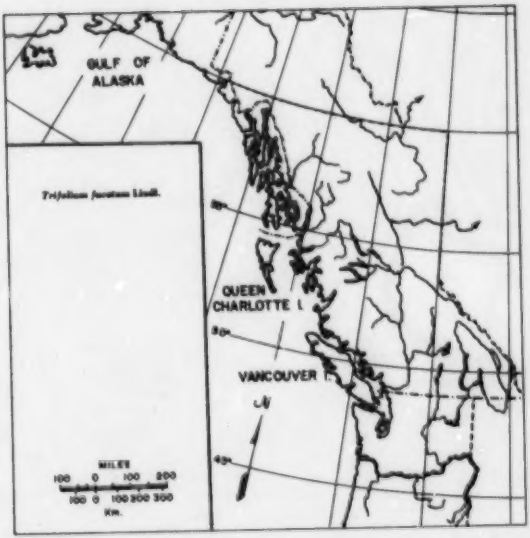


7. *Trifolium dubium* Sibth.—More or less hairy annual. Stems procumbent or ascending, up to 4 dm long. Leaves pinnately 3-foliate; leaflets about 11 mm long, obcordate or obovate, entire to remotely denticulate in the upper half; petiole short; stipules broadly ovate, acuminate. Racemes axillary, about 11 mm in diameter, 10- to 26-flowered, not involucrate; peduncles longer than the petioles. Flowers about 3 mm long, yellow, turning dark brown, reflexed at anthesis. Calyx glabrous, about half length of the corolla, 5-veined, teeth narrowly lanceolate, the upper broader but hardly half as long as the lower. Standard narrow, folded over the pod, longer than the wings and keel; pedicels shorter than the calyx tube. Pod about 3 mm long, ovoid, style shorter; seeds 1.

Grassy places as a weed; Europe. Generally established on the Coast as far north as Lat. 55°N.

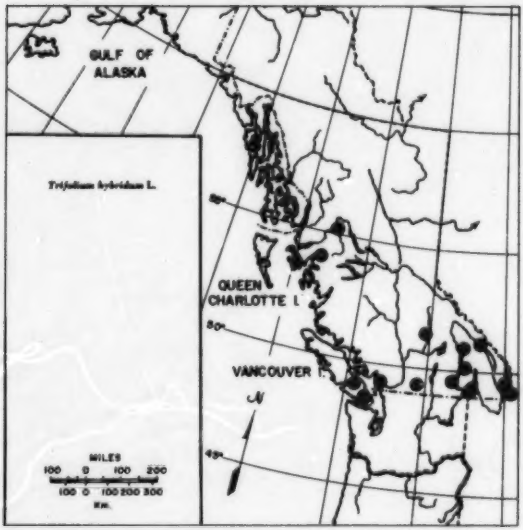


Least hop clover (left); Sour clover (right).



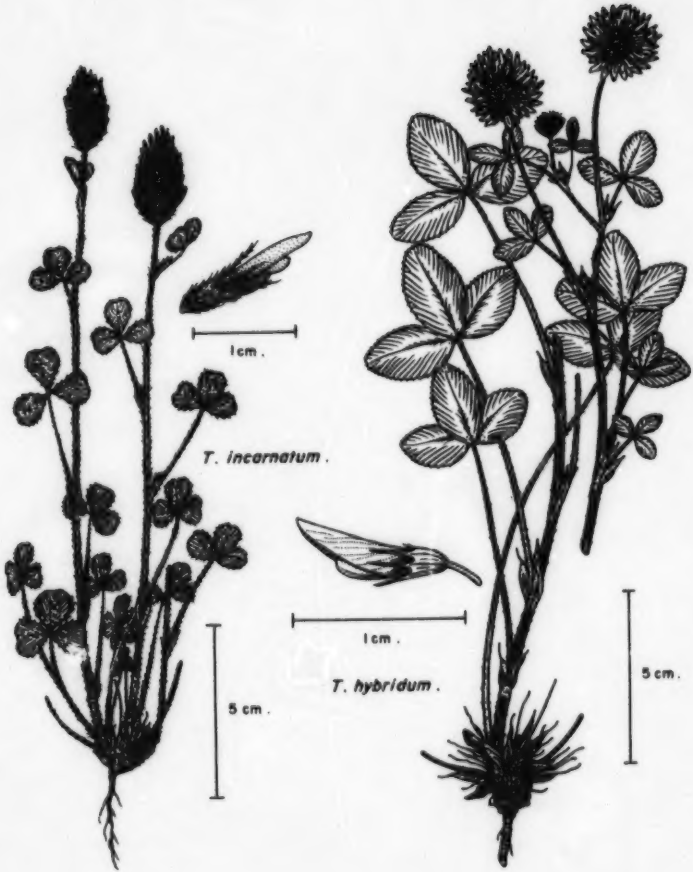
8. *Trifolium fucatum* Lindl. — Glabrous annual. Stems rather stout, diffuse, hollow, up to 8 dm tall. Leaflets generally less than 3 cm long, rhombic-ovate to obovate, denticulate to almost setose; stipules ovate, about 2 cm long. Peduncles 3–15 cm long, stout; involucre with 5–9 entire, setulose-tipped, scarious lobes. Calyx scarious, about 5 mm long, teeth subulate, simple. Corolla cream, becoming pink, much inflated in age, up to 25 mm long; keel dark purple. Pods stipitate; seeds 3–8 (*T. flavulum* Greene).

Moist places; Oregon to Californa, probably introduced in Washington and Vancouver Island. Reported from British Columbia by Boivin.

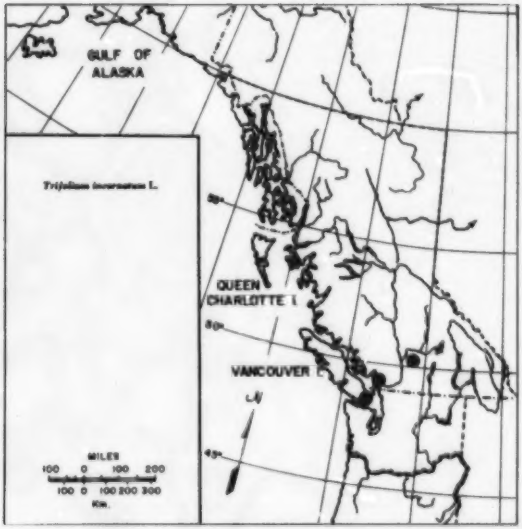


9. *Trifolium hybridum* L. — Nearly glabrous perennial. Stems erect or decumbent, up to 6 dm long. Leaflets 10–35 mm long, obovate or elliptic, sometimes obcordate or retuse, serrulate; stipules ovate-oblong with long acuminate tips. Heads all axillary, globose, as much as 25 mm in diameter; peduncles up to 15 cm long. Flowers white or pinkish; pedicels as much as 3 times length of the calyx tube. Calyx tube campanulate, whitish, weakly ribbed; teeth subulate, from about equalling to twice the length of the tube. Standard about 8 mm long, folded over the pod, about twice as long as the calyx. Pods about 4 mm long, oblong; seeds 2.

Roadsides and waste ground; Europe. Adventive, established locally.



Crimson clover (left); Alsike clover (right).

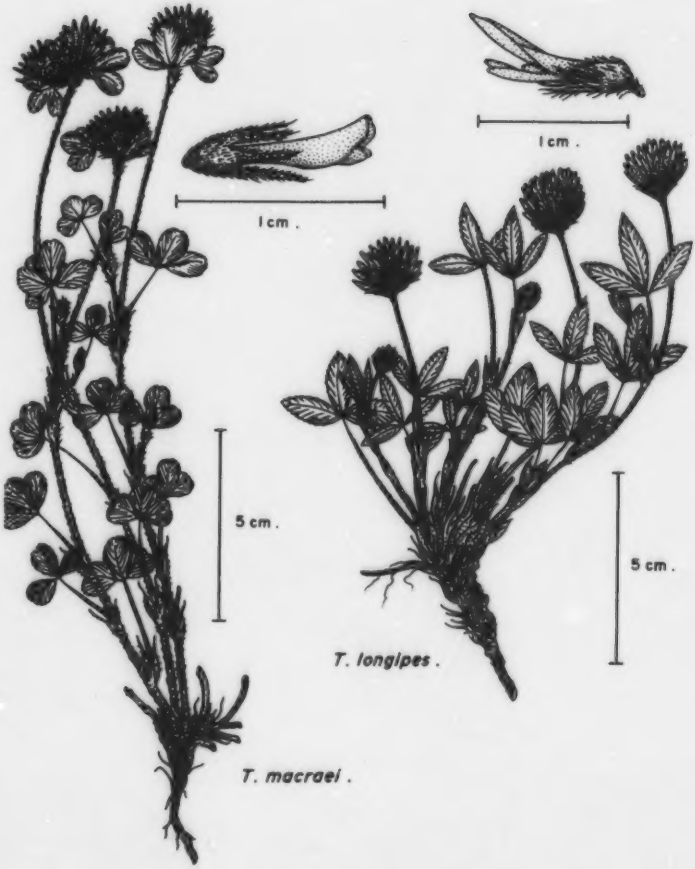


10. *Trifolium incarnatum* L.—Pubescent annual. Stems 1 to several, erect, usually unbranched, up to 7 dm tall. Leaflets 5–30 mm long, broadly obovate or obcordate, denticulate in upper half; petioles up to about 8 cm long; stipules membranous, ovate, obtuse, or acute, sheathing at base, margins more or less purplish. Heads 15–50 mm in diameter, terminal, ovoid or cylindrical, not involucrate but subtended by a single leaf. Flowers crimson or pale, sessile. Calyx tube cylindrical, villous, ribbed; teeth setaceous, nearly twice as long as the tube. Corolla longer than the calyx; standard longer than the wings and keel. Pods about 2.5 mm long, style stout; seeds usually 1.

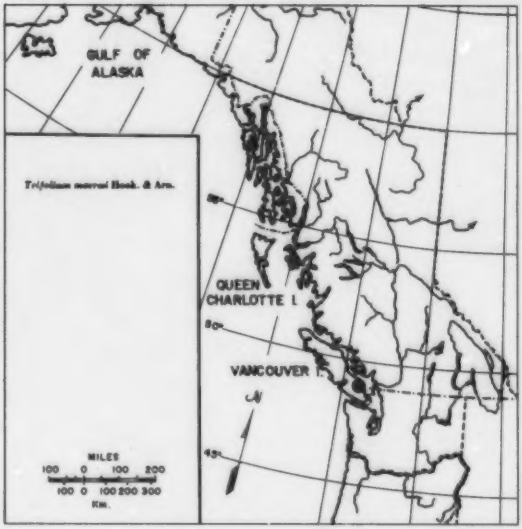
Eurasia, escaped from cultivation in a few places.

11. ***Trifolium longipes*** **Nutt.**—Perennial with creeping rootstock. Stems erect but more often trailing, up to 4 dm long, sparsely to copiously pubescent. Leaflets 3, those of stem leaves oblong-lanceolate to linear-lanceolate, about 3 cm long, somewhat serrulate, pale and glabrous above, appressed pubescent below, leaflets of lower leaves wider and shorted; stipules foliaceous, lanceolate, crose to entire. Peduncles exceeding the leaves; racemes terminal, densely many-flowered, not involucrate. Calyx about 8 mm long, more or less villous-pubescent; teeth subulate, much longer than the tube. Corolla yellowish to purplish, nearly twice as long as the calyx; seeds 1–4.

Moist meadows; southern British Columbia to southern California, east to Montana, Colorado, and Utah. Reported from British Columbia by Hitchcock.

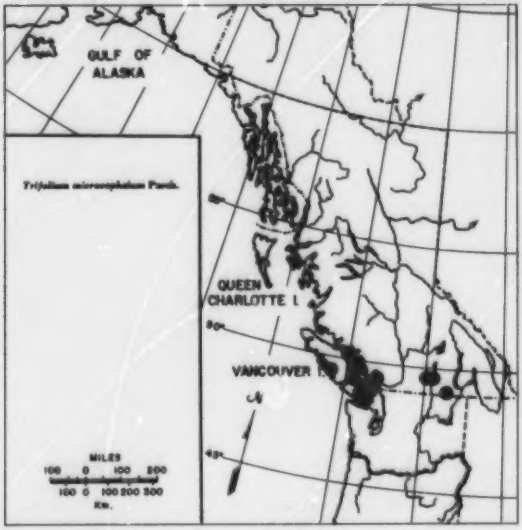


Macrae's clover (left); Long-stalked clover (right).



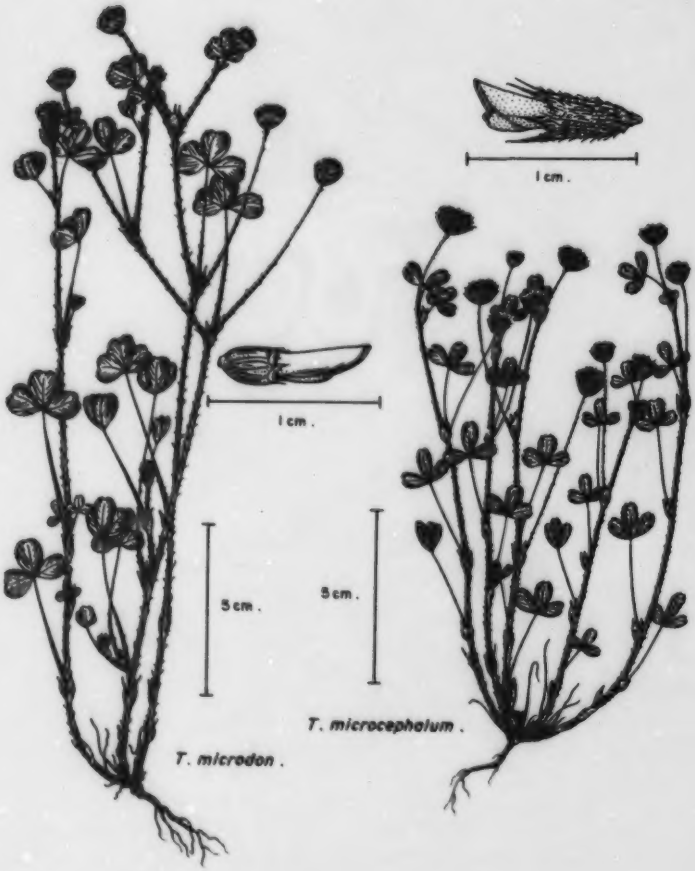
12. *Trifolium macraei* Hook. & Arn.—Soft-pubescent annual. Stems 1 to several, often stout, decumbent, or spreading, to 3 dm long. Leaflets obovate or oblanceolate, 8–12 mm long, obtuse or retuse; stipules ovate, denticulate, often with long to acuminate tips. Heads sessile, usually in pairs, short-ovoid, not involucrate. Flowers purple, rarely white. Calyx villous, tube 10- to 30-veined; teeth subulate, subequal, short plumose, much longer than the tube. Corolla about 6 mm long, longer than the calyx; seeds 1.

Open grassy places; Vancouver Island to California and Baja California; Chili. Known only from Nanaimo.

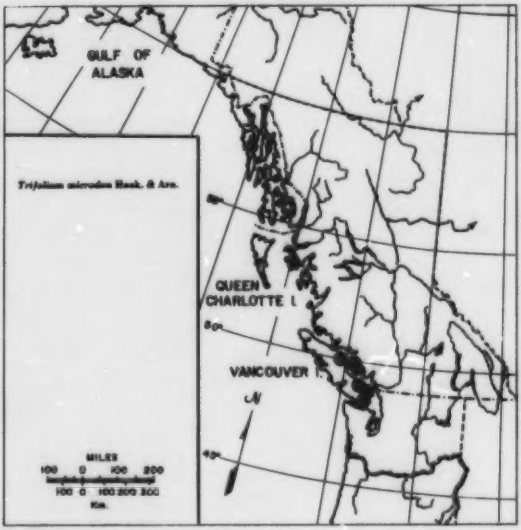


13. ***Trifolium microcephalum Pursh*** — Villous annual. Stems slender to 7 dm tall, simple to freely branched below, erect or decumbent. Leaflets 8–20 mm long, cuneate-obovate to obcordate, sharply denticulate; stipules ovate-acuminate, dentate. Heads globose, up to 10 mm in diameter; peduncles longer slender; involucre campanulate, 8–10 lobed, lobes lanceolate, entire, from equalling to much shorter than the calyx, margins scarious. Calyx pubescent, 4–7 mm long, 10- to 15-veined; teeth subulate, spiny-tipped, serrulate. Corolla pale lilac or pinkish, usually longer than the calyx. Pods about 3 mm long, usually rupturing the calyx at maturity; seeds 1 or 2.

Wet banks and grassy places; southern British Columbia to California, east to Montana, Nevada, and Arizon. Mostly on the Coast and in the southern Okanagan Valley.

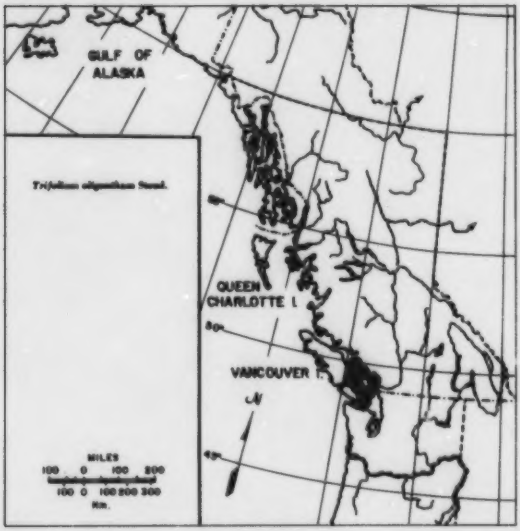


Thimble clover (left); Small-headed clover (right).



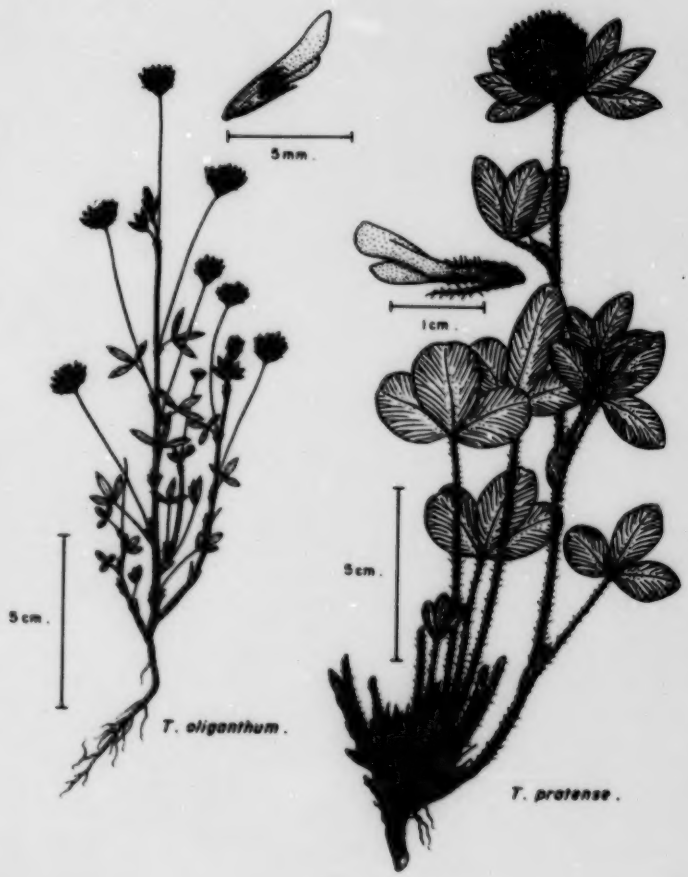
14. *Trifolium microdon* Hook. & Arn.—Subglabrous or sparsely puberulent annual. Stems slender, usually branched, more or less erect, up to 5 dm tall. Leaflets usually not more than 2 cm long, obcordate to oblanceolate, more or less setose-serrulate, glabrous above, pale and villous beneath; stipules lance-ovate, abruptly acuminate, entire or somewhat toothed. Peduncles long and slender; involucres 5–10 mm wide, deeply campanulate with about 10 lobes, scarious and subglabrous below; lobes toothed, green, more or less pubescent. Calyx about 4 mm long, glabrous, teeth short-triangular, abruptly apiculate, ciliate and scarious margined, much shorter than the tube. Corolla about 6 mm long, white to pale pinky-rose. Pods often rupturing the calyx; seeds 1.

Meadows and open sandy places; southwestern British Columbia to California, west of Cascades. Southern Vancouver Island and some Gulf Islands.

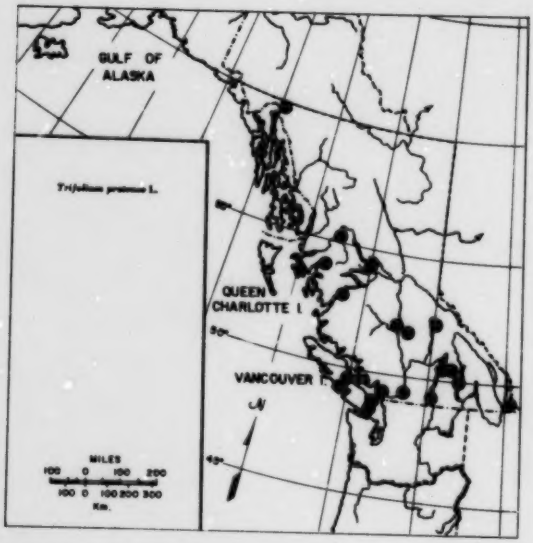


15. *Trifolium oliganthum* Steud.—Glabrous annual. Stems slender, erect to 4 dm, simple or branched, rather sparsely leafy. Leaflets about 2 cm long, linear to cuneate-oblong, entire to serrulate-setose for their full length, acute; stipules ovate, few-toothed, about one-quarter as long as the leaflets. Head 3- to 10-flowered; peduncles slender, as much as 10 cm long; involucre flat, small, divided almost to the base into irregular, lance-subulate teeth, or very much reduced and annular. Calyx 10-veined, about 5 mm long; teeth broadly subulate, somewhat shorter than the tube. Corolla considerably longer than the calyx, lavender with white tips, keep purplish; seeds 2 or 3.

Open woods and rocky ground; southwestern British Columbia to California, west of Cascades. Vancouver Island, the Gulf Islands, and adjacent Mainland.

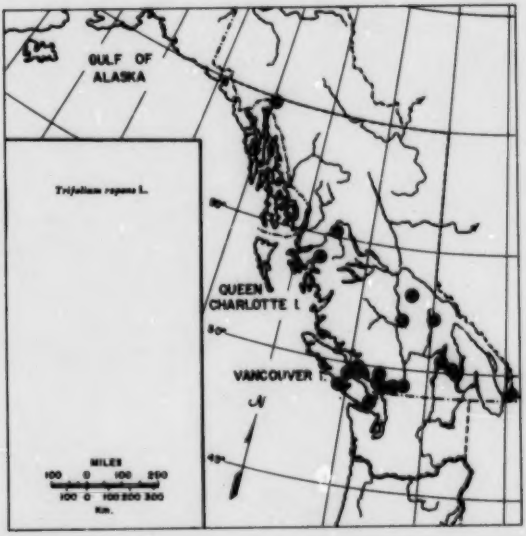


Few-flowered clover (left); Red clover (right).



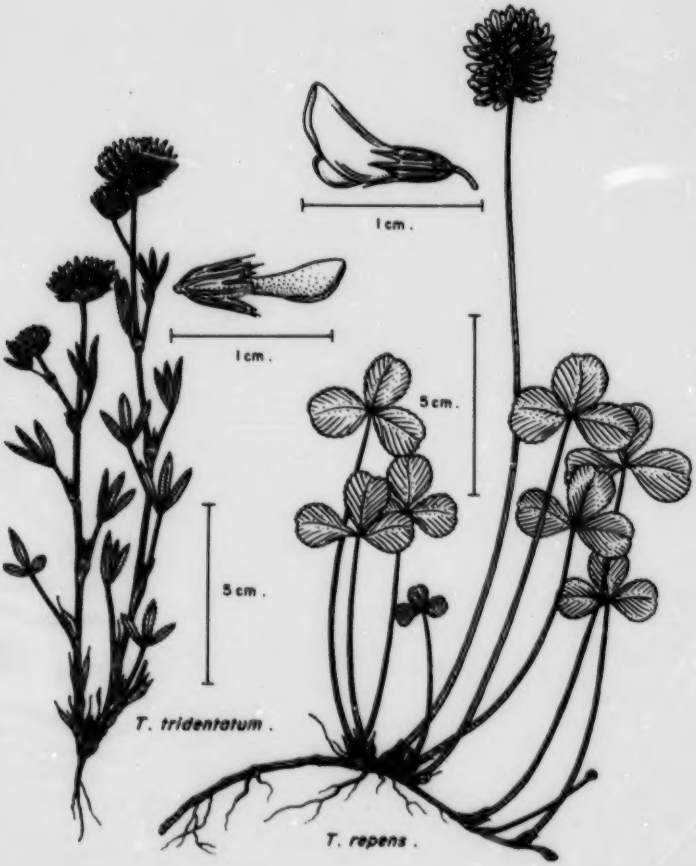
16. ***Trifolium pratense*** **L.** — Pubescent perennial. Stems erect or decumbent to 6 dm long. Leaflets 10–30 mm or more long, elliptic to obovate, often with white crescent-shaped spot toward the base; petioles up to 20 cm long; stipules ovate to oblong, free portion triangular with setaceous point. Heads terminal, up to 30 mm in diameter, globose, sessile, subtended by a pair of leaves; flowers pink-purple, sometimes paler, sessile. Calyx tube narrowly campanulate, ribbed, throat hairy; teeth unequal, longest about twice the length of the tube, all ciliate. Petals about 17 mm long, longer than the calyx. Pods about 2 mm long, obovoid; seeds 2.

Grassy places and waste ground; Eurasia, North Africa. Escaped from cultivation, widely established.

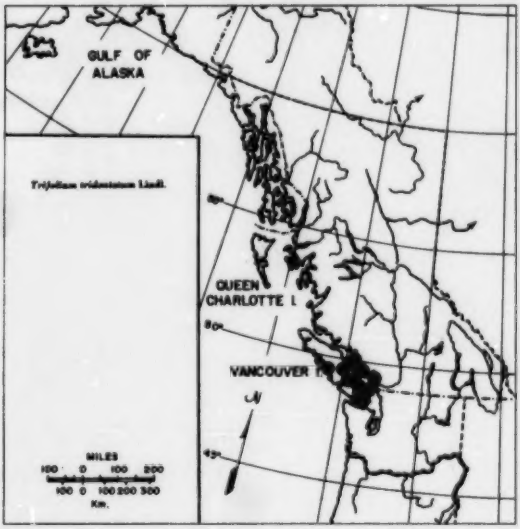


17. *Trifolium repens* L.—Perennial, glabrous or with scattered hairs. Stems branching from the base, creeping, rooting at the nodes, up to 6 dm long. Leaflets 10–25 mm long, obovate or obcordate, more or less serrulate, emarginate; stipules ovate to oblong, short subulate at tip; petioles up to 14 cm or more in length, erect. Heads all axillary, globose, not involucrate; peduncles very long, as much as 30 cm. Flowers white or pinkish; pedicels about 3 mm long, reflexed in age. Calyx glabrous; tube campanulate white with greenish veins; teeth narrowly triangular, about half as long as the tube. Standard about 9 mm long, folded over the pod, 2–3 times as long as the calyx. Pods about 5 mm long, oblong; seeds 3–6.

Grassy places, fields and roadsides; Eurasia, North Africa. Widely escaped from cultivation.

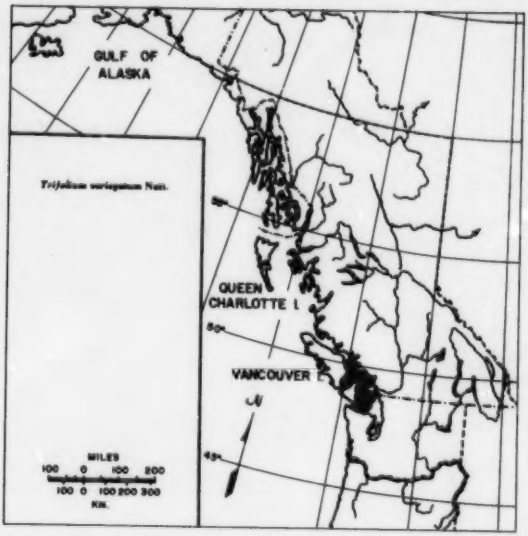


Sand clover (left); Dutch clover (right).



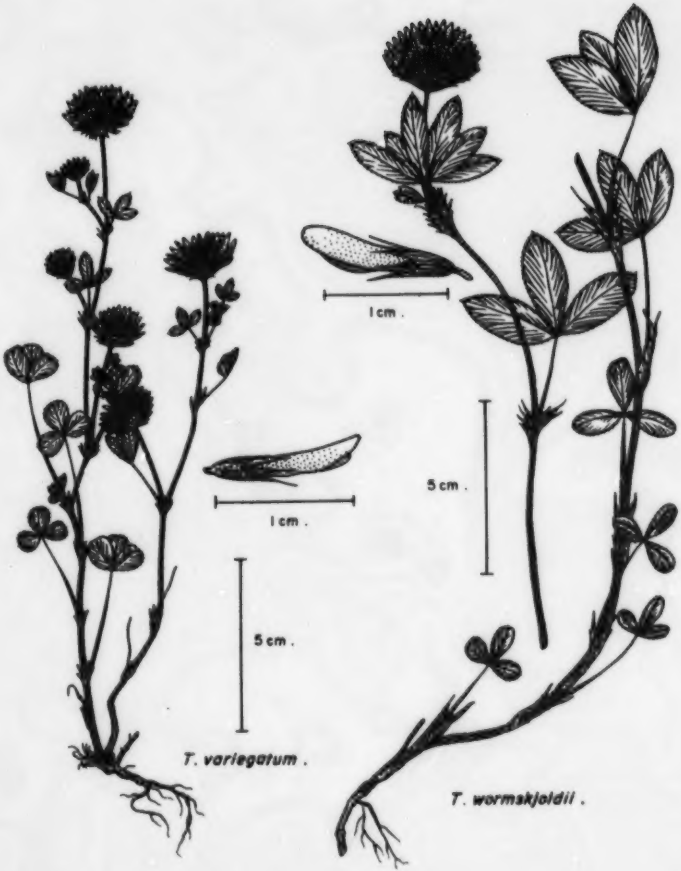
18. *Trifolium tridentatum* Lindl. — Glabrous annuals. Stems erect to more or less decumbent, up to 5 dm long. Leaflets 15–35 mm long, linear to lance-oblong, somewhat setaceous toothed for full length; lower stipules lanceolate, acuminate, entire, the upper round-ovate, laciniate. Peduncles axillary, 5–9 cm long; involucre flat, 10–15 mm in diameter, irregularly lacerate to about half the depth, but not lobed. Calyx tube 10-veined, often purplish; teeth usually dilated below, shorter than the tube, often with 2 short, lateral teeth. Corolla about 12 mm long, red-purple; banner paler toward the tip, wings dark, slightly longer than the calyx; seeds 2.

Grassy places; southwestern British Columbia to California, west of Cascades. Southern Vancouver Island, Gulf Islands, and adjacent Mainland.

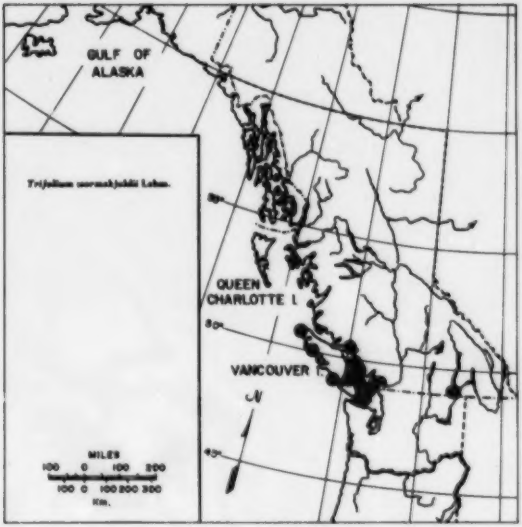


19. *Trifolium variegatum* Nutt.—Glabrous annual. Stems several from the base, decumbent or ascending to 6 dm. Leaflets variable, cuneate-cordate to obovate or oblong-lanceolate, setose-serrulate; stipules ovate, deeply laciniate. Peduncles slender, longer than the leaves; heads subglobose; flowers 3 to many; involucre 4–12 lobed, these laciniate toothed. Calyx tube narrowly campanulate, 10- to 25-veined; teeth subulate-setaceous, much longer than the tube, simple or one tooth bifid. Corolla purple, white-tipped, about 7 mm long, slightly longer than the calyx. Pod usually rupturing the calyx; seeds usually 2.

Moist places; southwestern British Columbia to California, occasionally east to Montana and Utah. Southern Vancouver Island, Gulf Islands, and adjacent Mainland.



White-tip clover (left); Springbank clover (right).



20. *Trifolium wormskjoldii* Lehm. — Glabrous perennial with creeping rootstock. Stems decumbent, up to 3 dm long, branched. Leaflets 1–3 cm long, oblanceolate to oblong-obovate, acute and mucronate or obtuse, setulose-serrate; stipules lanceolate, laciniate toothed, acuminate. Peduncles 2–6 cm long, heads axillary, 2- to many-flowered; involucre 12–15 mm broad, flattish-flaring, lacerate lobed, lobes entire. Calyx about 9 mm long, 10-veined, teeth subulate occasionally bifid, slightly longer than the tube. Corolla about 12 mm long; standard broad purple, often white-tipped, wings and keel darker; seeds 2–6 (*T. fimbriatum* Lindl.).

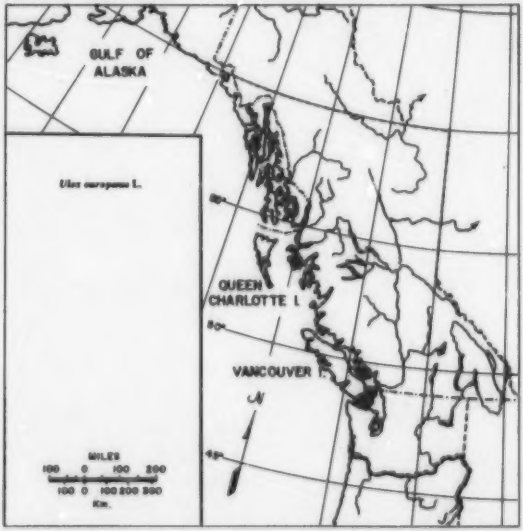
Wet places; British Columbia to California and Mexico, east at high elevations to Idaho, Colorado, and New Mexico. Known with us from Queen Charlotte Islands, Vancouver Island, Lower Mainland, and Rossland.

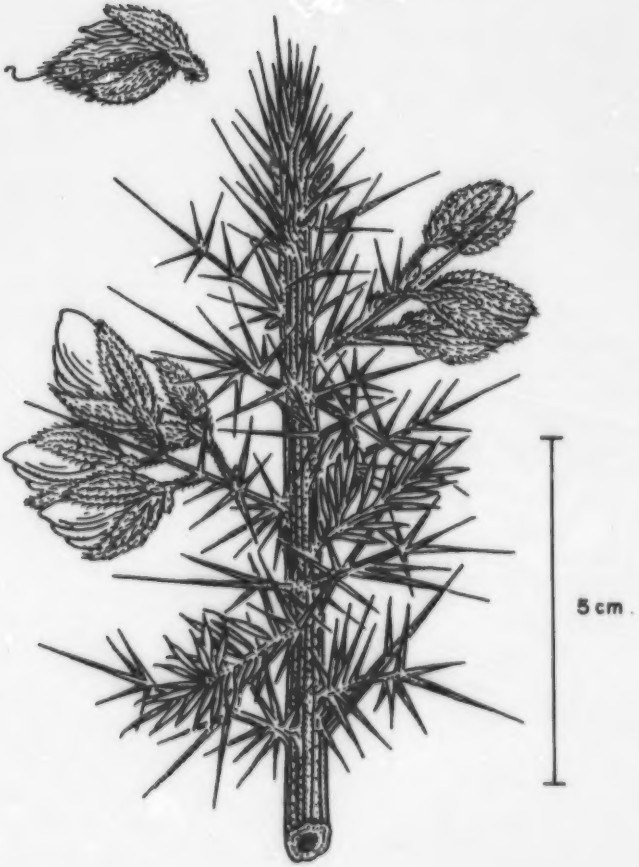
ULEX L. Gorse, Furze

Densely branched shrubs with stiff, green, branched spines. Leaves 3-foliolate on young plants, reduced to scales or spines on older plants; stipules lacking. Flowers papilionaceous, yellow, showy, axillary, short-pedicelled. Calyx ovate, wings and keel obtuse, keel pubescent. Stamens 10, monodelphous. Style somewhat curved, stigma capitate. Pods short-oblong, 2-valved, explosively dehiscent; several seeded.

About 20 species of western Europe and northwest Africa.

Ulex europæus **L.**—Spiny, somewhat glaucous shrub up to 2 m or more tall. Main branches ascending, greenish, prominently angled, pubescence sparse, blackish; spines 15–25 mm long, stiff, deeply furrowed. Leaves acicular, shorter than the spines. Fowers yellow, about 15 mm long; pedicel densely velvety. Calyx yellow, about two-thirds as long as the corolla, pubescent with spreading hairs, teeth connivent. Wings slightly longer than the keel; keel hairy along the lower margin Pods about 15 mm long, black with dark hairs.





Gorse (*Ulex europæus*).

Rough, grassy, and gravelly places; western Europe. Escaped from cultivation and established in a few places, chiefly southern Vancouver Island.

VICIA L. Vetch

Annual or perennial herbs. Stems climbing or scrambling, often angled. Leaves equally pinnate, simple or branched tendrils usually present; leaflets opposite or alternate in 2 to many pairs; stipules entire to sagittate. Flowers papilionaceous in axillary racemes; wings adherent to the keel. Calyx teeth subequal or the lower longer. Stamens 10, diadelphous. Style glabrous or densely pubescent just below the stigma. Pod compressed, dehiscent, several seeded.

About 150 species in North Temperate regions and South America.

HERMANN, F. J. Vetches in the United States—native, naturalized and cultivated. U.S.D.A. Agr. Handb. **168**:1–84. 1960.

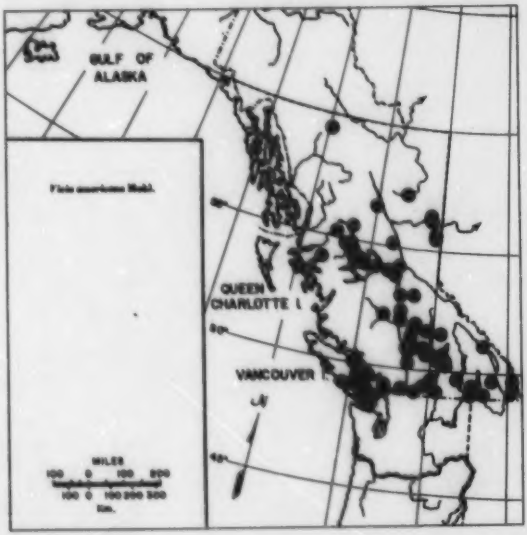
1. Peduncle, if present, much shorter than the leaflets; flowers few (often solitary or paired), sessile or subsessile in upper leaf axils.
   Tendrils all simple; flowers less than 8 mm long, solitary; calyx less than 6 mm long; seeds quadrangular, verrucose ....*V. lathyroides*
   Tendrils mostly forking; flowers more than 10 mm long, mostly 2–5; calyx more than 9 mm long; seeds globose to flattened orbicular, smooth .....*V. sativa*
1. Peduncle well developed, nearly equal to much exceeding the leaflets; flowers 1 to many.
   2. Corolla less than 9 mm long; racemes 2- to 8-(13-)flowered or flowers solitary.
      Calyx lobes equal or nearly so; pod pubescent, less than 10 mm long; peduncle 3- to 8-flowered .....*V. hirsuta*
      Calyx lobes unequal; pod glabrous, more than 10 mm long; peduncle 1- or 2-flowered .....*V. tetrasperma*
   2. Corolla more than 9 mm long, or else racemes 10- to 40-flowered.
      3. Mature inflorescence equal to or longer than the subtending leaves; flowers less than 15 mm long.
         Calyx strongly gibbous at base, pedicel appearing ventral; lower calyx teeth linear-acicular; blade of standard less than half as long as the claw; annual or biennial .....*V. villosa*
         Calyx slightly, if at all, gibbous at base, pedicel basal; lower calyx teeth lance-attenuate; blade of standard equal or longer than the claw; perennial .....*V. cracca*

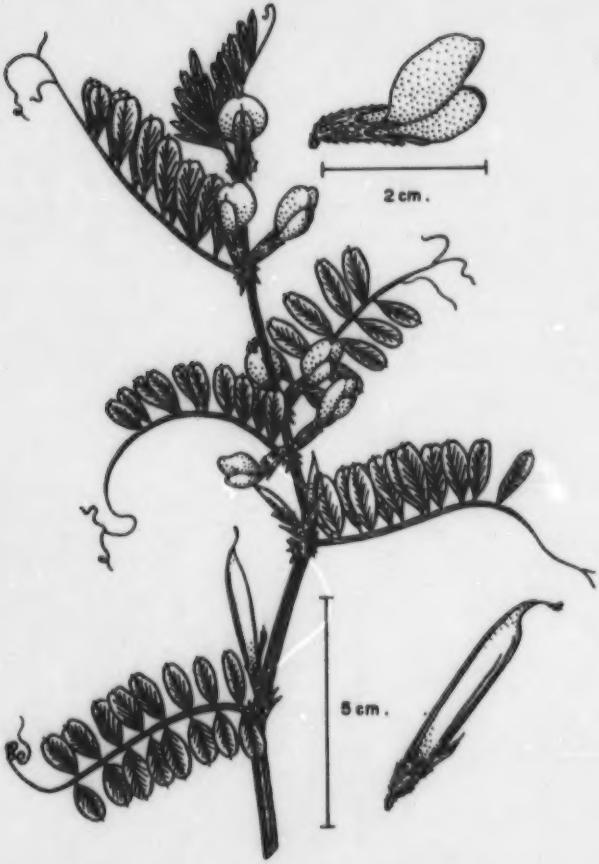
3. Mature inflorescence shorter than the subtending leaves; flowers more than 15 mm long.

Flowers yellowish tinged with red or brown, or purple-red fading to dark purple; leaflets more than 18; racemes 7- to 20-flowered; plant usually turning black on drying ..... *V. gigantea*

Flowers lavender, violet or bluish-purple; leaflets less than 18; racemes 3- to 9-flowered; plant not turning black on drying ..... *V. americana*

1. *Vicia americana* Muhl.—Perennial. Stems glabrate to densely pubescent, trailing or climbing, as much as 1 m tall. Leaves with simple or branched, prehensile, terminal tendril, leaflets 8–18; leaflets 15–35 mm long, very variable in width, linear to oval, lateral veins very prominent and rib-like on drying, rounded to truncate or emarginate at apex; stipules more or less lunate, sharply serrate to lacerate. Racemes loosely 3- to 9-flowered, shorter than the subtending leaves. Flowers bluish-purple, about 2 cm long. Calyx tube very oblique, about one-third the length of the corolla;



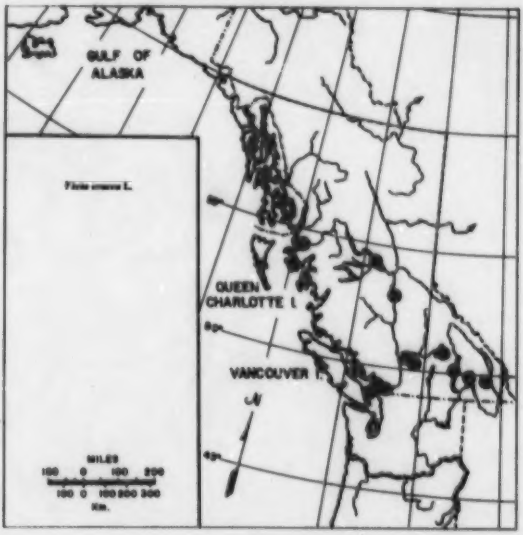


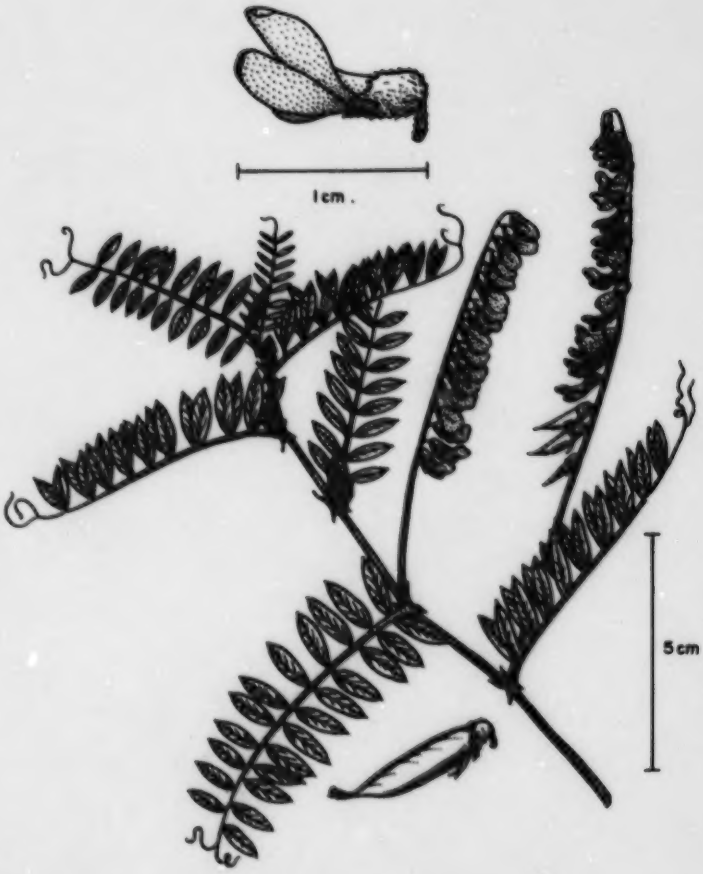
American vetch (*Vicia americana*).

teeth about half the length of the tube but very variable, the lower usually lance-attenuate, the upper short and broad. Pod about 3 cm long, glabrous.

Open woods and meadows; southern Alaska to Ontario, south to California, northern Mexico, Minnesota, and West Virginia. Very common throughout.

2. ***Vicia cracca*** **L.**—Perennial. Stems climbing or trailing to 2 m, appressed-pubescent to glabrate, angled, striate. Leaves with terminal, branched, prehensile tendril, leaflets 16–24; leaflets up to 30 mm long, narrowly oblong to linear or elliptic, mucronate, appressed-pilose or silky to glabrate; stipules semisagittate, entire. Racemes usually longer than the peduncle, densely 20- to 50-flowered, secund, from about equalling to one and one-half times the length of the subtending leaf. Flowers crowded, reflexed, 8–12 mm long, blue-violet or purple, sometimes pale. Calyx tube about 3 mm long, gradually rounded or slightly gibbous at base on the upper side; upper teeth very short, broadly triangular, lower teeth much longer, lance-attenudate. Blade of standard more or





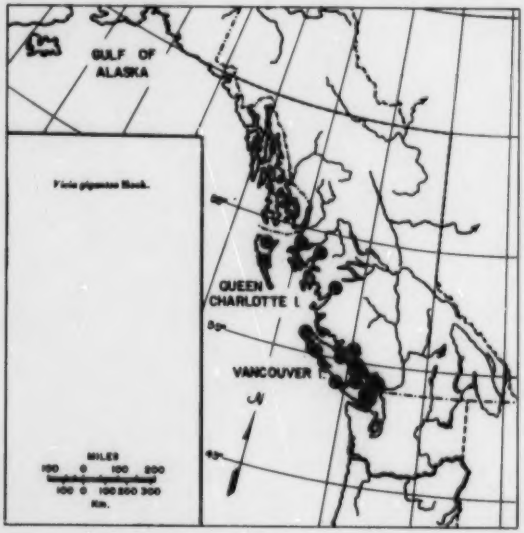
Bird vetch (*Vicia cracca*).

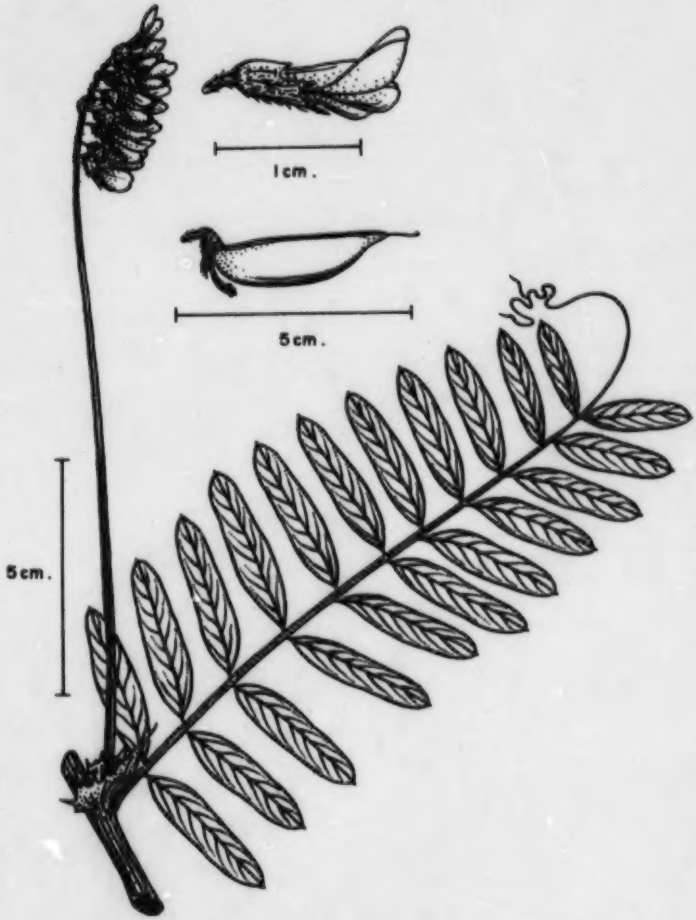
less equalling the claw. Pod about 3 cm long, glabrous, narrowly rhomboid; seeds 4–8.

Fields, thickets, and open woods; Eurasia. Widely established in British Columbia south of about Lat. 55°N.

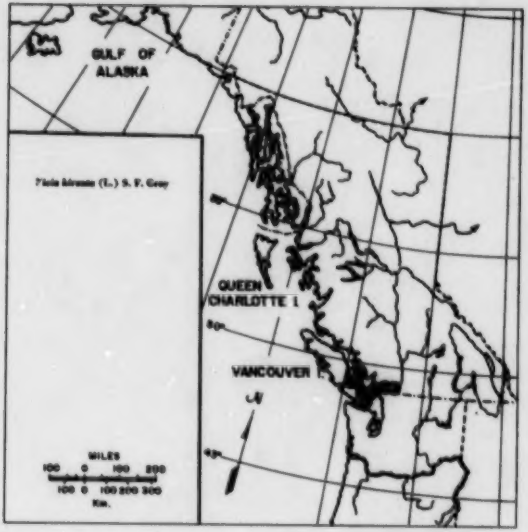
3. *Vicia gigantea* Hook.—Succulent perennial, whole plant turning black on drying. Stems stout, up to 12 dm long, ascending or climbing, stout, more or less hollow, conspiculously angled, sparingly pubescent. Leaves with well-developed prehensile, terminal tendril, leaflets 18–26; leaflets 15–35 mm long, narrowly oblong to oblong-lanceolate, obtuse, mucronulate, somewhat strigose; stipules about half the length of the leaflets. Racemes densely 7- to 20-flowered, secund. Flowers 12–18 mm long, reddish-purple to yellowish. Calyx about half the length of the corolla, lower teeth about equalling the tube, the upper almost obsolete. Pod oblong, about 4 cm long, glabrous; seeds 3 or 4.

Edge of woods, stream sides, clearings; southern Alaska to central California, west of Coast Mountains. Common coastal species.





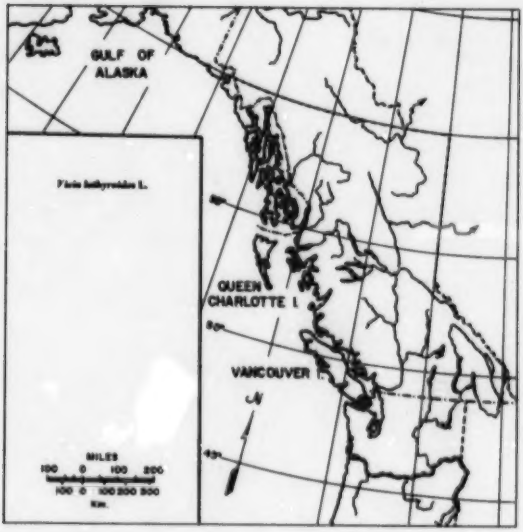
Giant vetch (*Vicia gigantea*).



4. *Vicia hirsuta* (L.) S. F. Gray—Glabrate or sparingly pubescent annual. Stems slender, decumbent or climbing, as much as 7 dm long, 4-angled, striate, usually branched at base. Leaves sessile, with terminal, slender, usually branched tendril, leaflets 12–16; leaflets 5–18 mm long, narrowly oblong or narrowly elliptic, usually truncate or emarginate, mucronate; stipules often 4-lobed. Peduncles mostly shorter than the subtending leaves, 3- to 6-flowered. Flowers very small, about 4 mm long, whitish-blue to purplish-blue; pedicels less than 2 mm long. Calyx minutely pubescent, teeth subequal, shorter than the tube. Pod about 10 mm long, oblique at both ends, hirsute; seeds 2.

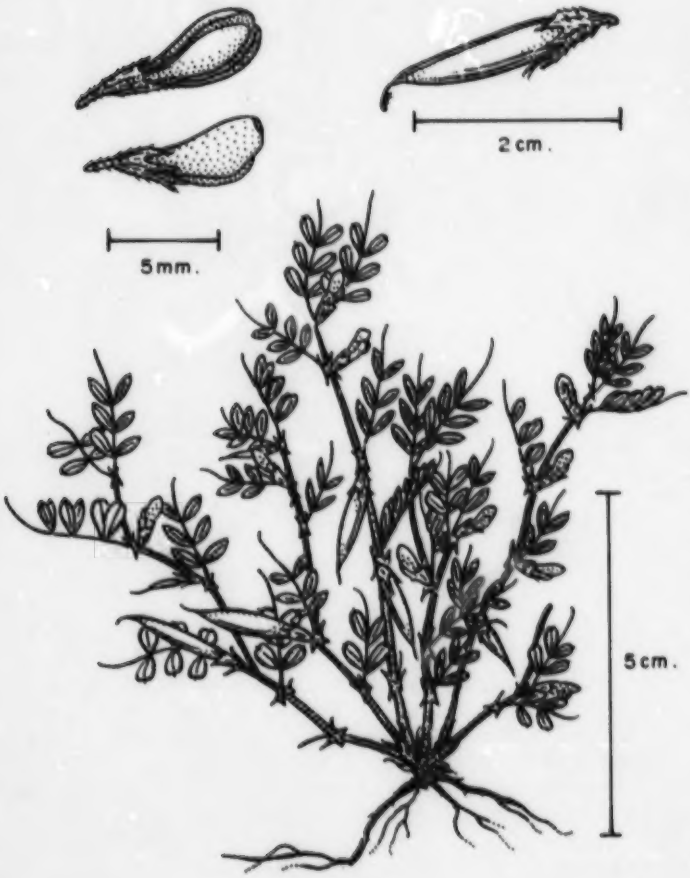
Waste ground; Europe. Naturalized in many places on southern Vancouver Island and the lower Fraser Valley.

Hairy vetch (*Vicia hirsuta*).

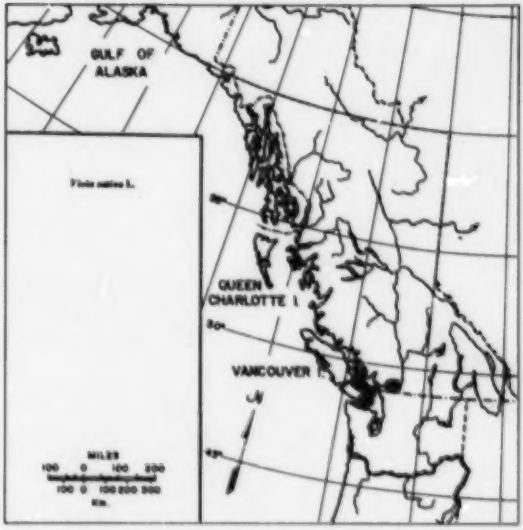


5. *Vicia lathyroides* L.—Low, more or less pubescent annual. Stems spreading to suberect, usually not more than 20 cm long. Leaves small with a simple, usually unbranched terminal tendril, leaflets 4–6; leaflets commonly less than 15 mm long, narrowly obovate to elliptic-linear, usually apiculate; stipules small, semi-sagittate, entire. Flowers 1, rarely 2, subsessile in axils of upper leaves, about 6 mm long, violet fading to white. Calyx tube obconic, teeth lanceolate-subulate, about equalling the tube. Pod up to 30 mm long, linear, tapering to both ends, somewhat compressed, glabrous; seeds 8–12.

Sandy grassland; Europe. Known only from the vicinity of Victoria.



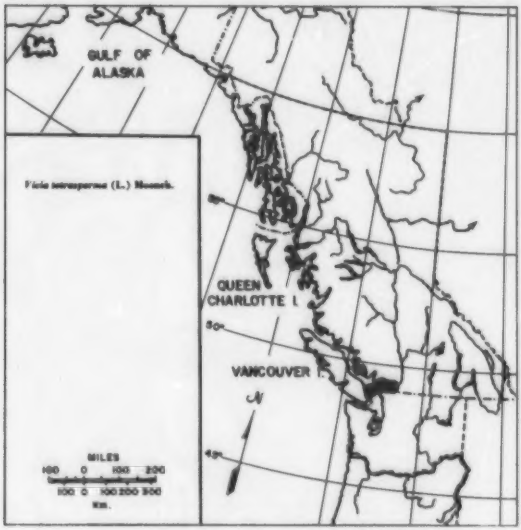
Spring vetch (*Vicia lathyroids*).



6. *Vicia sativa* L.—Sparsely hairy annual. Stems slender, usually not more than 1 m long, erect-ascending or climbing, angled, simple or branched below. Leaves with branched terminal tendril, leaflets 8–16; leaflets less than 35 mm long, oblong to linear to obovate, truncate to emarginate, mucronate; stipules semisagittate, usually sharply serrate, often with a dark blotch. Flowers mostly paired in upper axils, 10–30 mm long, violet-purple, rarely white. Calyx-tube campanulate, teeth subequal, linear subulate, as long as the tube. Pods linear oblong, beaked, sparsely hairy to glabrous, up to 7 cm long; seeds 4–12 (*V. angustifolia* L.).

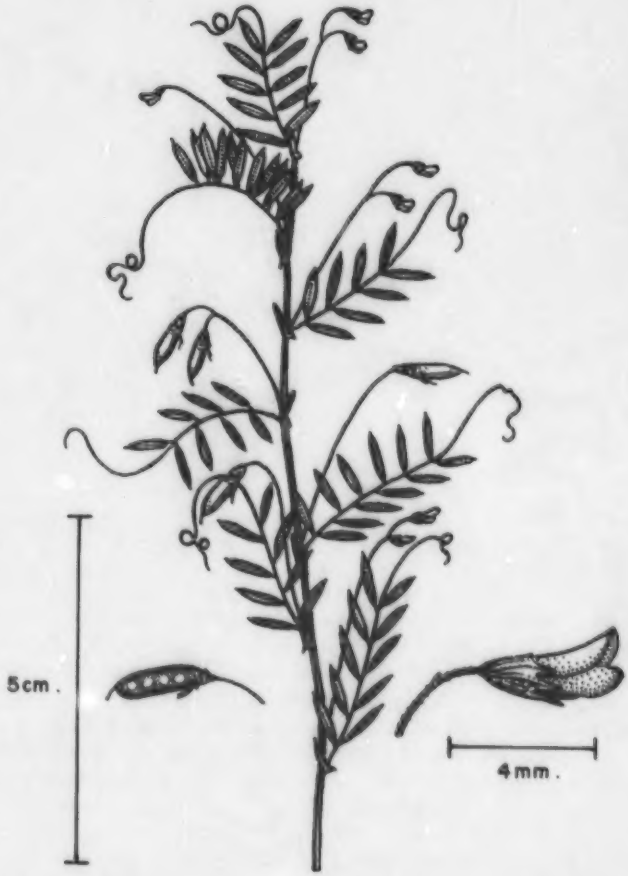
Grassy, waste ground; Europe. Escaped from cultivation, established on southern Vancouver Island and the lower Fraser Valley.

Common vetch (*Vicia sativa*).

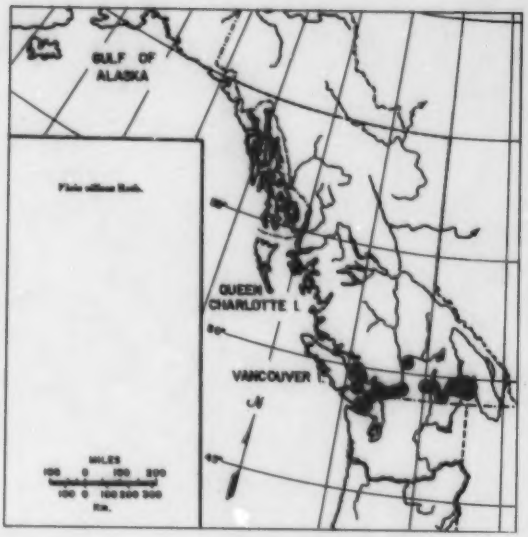


7. *Vicia tetrasperma* (L.) Moench.—Glabrous or sparsely pilose annual. Stems very slender, decumbent or climbing up to 5 dm, branches often matted. Leaves usually with a simple tendril, leaflets 8–12; leaflets 10–20 mm long, narrow oblong or narrowly elliptic, apex rounded, mucronate; stipules semisagittate, entire, peduncles filiform, longer than the leaflets but equalling the leaves in fruit, 1- or 2-flowered. Flowers lilac veined with purple, or bluish white, commonly about 4 mm long. Calyx teeth unequal, the lower lanceolate, about equalling the tube, the upper triangular, much shorter than the tube. Pods flat, up to 15 mm long, oblong, short stipitate, glabrous; seeds 4.

Grassy, waste places; Eurasia. Naturalized in several places on the Coast, mostly in the lower Fraser Valley.

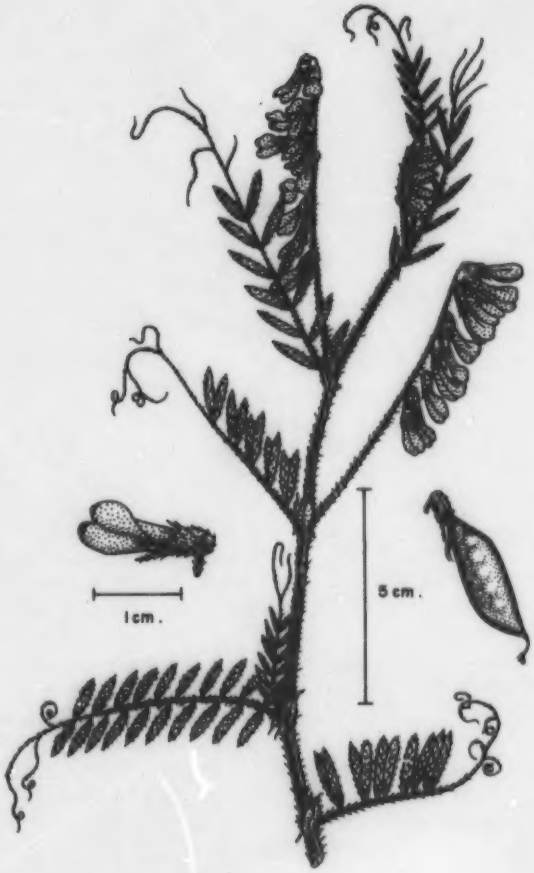


Slender vetch (*Vicia tetrasperma*).



8. *Vicia villosa* Roth.—Annual or biennial. Stem spreading villous, clambering to 1 m. Leaves with branched, terminal, prehensile tendril, leaflets 10–20; leaflets up to 25 mm long, narrowly oblong to linear-lanceolate, obtuse or acute; stipules semisagittate, entire to toothed. Racemes densely 10- to 40-flowered, longer than the subtending leaf. Flowers secund, 12–20 mm long. Calyx irregular, villous, tube not more than 4 mm long, strongly gibbous on upper side at base, pedicel apparently inserted ventrally; lower teeth linear-aciculate, long-villous, as long as the tube, the upper linear-triangular, much shorter. Corolla violet and white, or rose and white; blade of standard less than half the length of the claw. Pods 2–3 cm long, oblong, obliquely beaked, stipe longer than the calyx tube.

Roadsides and waste ground; Eurasia, North Africa. Widely naturalized, particularly in the Interior.



Winter vetch (*Vicia villosa*).

GLOSSARY

The following standard reference works have been freely consulted in the preparation of the glossary: *A Glossary of Botanic Terms,* by B. D. Jackson; *A Dictionary of Scientific Terms,* by Henderson and Henderson, fifth edition by J. H. Kenneth; and *Taxonomic Terminology of the Higher Plants,* by H. I. Featherly:

Acaulescent—Stemless.

Acerose—Needle-shaped; having a sharp, rigid point, as the leaf of a pine.

Acuminate—Gradually tapering to a long point.

Aduate—With unlike parts congenitally grown together.

Amplexicaul—Clasping or embracing the stem, as a leaf or stipules.

Anthesis—The act of flowering; strictly, the time of expansion of a flower, but often used to designate the flowering period.

Apiculate—Ending in a short and sharp but not stiff point.

Appressed—Lying flat, pressed against some other structure.

Arcuate—Curved to some degree; arching.

Areolate—Divided into distinct spaces; reticulate.

Ascending—Curving upward; rising at first obliquely then erect.

Auricle—Small lobe or ear-shaped appendage.

Auriculate—With an ear-shaped lobe, usually basal.

Awn—A bristle-like appendage.

Axil—The upper angle formed between the axis and any organ that arises from it.

Axis—The main or central line around which organs develop.

Basifixed—Attached or fixed by the base.

Bicarinate—Two-keeled.

Bidentate—Having two teeth.

Bifid—Forked; divided into two parts.

Bilabiate—Two-lipped.

Biloculate—Having two chambers or cavities.

Bract—A floral leaf; a modified leaf in whose axil a flower arises.

Bracteolate—With small bracts.

Caducous—Falling off early, or prematurely, as the sepals or bracts in some plants.

Calyx—The outermost circle of the floral envelopes, composed of separate or connate sepals.

Campanulate—Bell-shaped.
Canescent—Becoming hoary, usually with a grey pubescence.
Capitate—Shaped like a head or in a head-like arrangement; enlarged or swollen at tip.
Carpel—A simple pistil; one unit of a compound pistil.
Caudate—With a slender, tail-like appendage.
Caudex—The woody base of a perennial plant; the axis of a plant consisting of stem and roots.
Caulescent—Stemmed.
Cauline—Pertaining or belonging to the stem.
Chasmogamous—With pollination taking place while the flower is open; the opposite to cleistogamous.
Cilia—Marginal hairs or hair-like processes.
Claw—The long narrow stalk-like base of the petals or sepals in some flowers.
Chartaceous—Having the texture of writing paper.
Cleistogamous—Having fertilization take place within the unopened flower.
Concolorous—Uniform in colour.
Conduplicate—Folded together lengthwise.
Connate—Like parts fused or grown together.
Ciliate—Fringed with hairs, usually along a margin.
Connivent—Coming together or converging but not organically connected.
Cordate—Heart-shaped with special reference to the base of a structure.
Corolla—The inner floral envelope, composed of separate or connate petals.
Cuneate—Wedge-shaped with the acute angle downward, applied particularly to leaf bases.
Cuspidate—Tipped with a sharp, rigid point.
Deciduous—Not persistent; dropping or being shed at the end of a growing season.
Declined—Bent or curved downward.
Decumbent—Prostrate but with the growing tip erect or ascending.
Decurrent—Extending downward on a stem and fused with it.
Deflexed—Bent or turned abruptly downward.

Dehisce—To open spontaneously when ripe, as seed capsules.

Deltoid—More or less broadly triangular in shape; shaped like the Greek letter Δ.

Dentate—Toothed, usually with sharp teeth directed outward.

Denticulate—Minutely toothed on margin.

Diadelphous—Said of stamens formed in two groups through the union of their filaments.

Didymous—Divided into two lobes; found in pairs as of some fruits.

Diffuse—Loosely branching or spreading; of open growth.

Digitate—Finger-like; compound with the members arising from one point.

Dimorphic—Occurring in two forms.

Distal—End of any structure farthest from the mid line of an organism or from the point of attachment; the opposite of proximal.

Divaricate—Widely divergent.

Dolabriform—Axe-shaped.

Dorsal—Relating to the back, or attached thereto; the surface turned away from the axis; surface farthest from the axis.

Elliptic—A flat structure that is oval and narrowed to rounded ends.

Emarginate—With a shallow notch at the apex.

Erose—Margin ragged as if gnawed.

Falcate—Scythe or sickle-shaped; flat and curved, tapering gradually to a point.

Filiform—Threadlike; long and very slender.

Fistular—Hollow-cylindrical.

Flexuous—Bent alternately in opposite directions.

Foliaceous—Leaf-like; said particularly of sepals, bracts, and stipules that look like leaves.

Free—Not fused or adhering.

Fugacious—Soon falling or fading; not permanent.

Geminate—In pairs; twin.

Gibbous—Swollen on one side; a pouch-like enlargement of the base of an organ, as of a calyx or corolla.

Glabrescent—Hairy when young but glabrous in maturity.

Glabrous—Smooth; devoid of pubescence and hairs of any sort.

Glaucous—Covered or whitened with a "bloom"; bluish-green.

Globose—Spherical, globular.

Gynophore—The stipe of an ovary prolonged within the calyx.

Hastate—Halbert-shaped, sagittate, with the basal lobes turning outward.

Head—A dense spherical or flat-topped inflorescence of sessile flowers clustered on a common receptacle.

Hilum—The scar or mark on a seed indicating the point of attachment.

Hirsute—Hairy, with stiff or bristly hairs.

Hispid—Beset with stiff or bristly hairs, so rough in texture.

Hispidulous—Somewhat or minutely hispid.

Imbricate—Overlapping, as shingles on a roof.

Indeterminate—Said of an inflorescence in which the flowers open progressively, from the base upward or from the outside inward.

Internode—Portion of a stem between adjacent nodes.

Involucre—A cluster of bracts subtending a flower or inflorescence.

Involute—Rolled in from the edges, the upper surface within.

Keel—The united petals of a leguminous flower.

Lacerate—Irregularly cleft as if torn.

Laciniate—Irregularly cut with narrow lobes, as if slashed.

Lacustrine—Belonging to, or inhabiting lakes or ponds.

Lanate—Clothed with woolly and interwoven hairs.

Lanceolate—Lance-shaped; several times longer than wide, broadest below the middle and tapering to both ends.

Legume—A dry fruit of a simple pistil usually dehiscing along two lines of suture, the fruit of the Leguminosæ.

Lentiform—Lens-shaped.

Linear—Long and narrow with margins parallel or nearly so.

Loment—A flat legume which is constricted between the seeds, when mature falling apart at the constrictions into one-seeded joints.

Lunate—Shape of a half-moon or crescent.

Marcescent—Withering without falling off.

Monadelphous—With stamens united by their filaments into a tube or column.

Mucronate—Abruptly terminated with a sharp tip or point.

Nigrescent—Turning black.

Node—Place on a stem at which a leaf or a whorl of leaves normally arises.

Ob—Prefix indicating inversely or oppositely as in "oblanceolate."

Oblong—Longer than broad with the margins nearly parallel.

Obtuse—Rounded or blunt at the apex.

Oval—Broadly elliptic with the width greater than half the length.

Ovate—Shaped like the longitudinal section of a hen's egg, the broader end basal.

Ovoid—A solid that is ovate in longitudinal section; egg-shaped in three dimensions.

Ovules—That which becomes a seed after fertilization.

Palmate—Resembling a hand with the fingers spread; having lobes radiating from a common point.

Panicle—A compound or branched raceme.

Paniculate—Having a panicle type of inflorescence or branching.

Pannose—Having the appearance or texture of felt or woollen cloth of very close weave.

Papilionaceous—Descriptive of the flower of many legumes having a standard, wings, and keel; with a pea-like flower, like a butterfly.

Pedicel—An ultimate flower-stalk, the support of a single flower.

Pendulous—Hanging downward.

Peduncle—A primary flower-stalk supporting either a cluster or a solitary flower.

Perfect—Said of flowers having both sex organs present and functioning.

Persistent—Remaining attached; not falling off.

Petiolar—Borne on or pertaining to a petiole.

Petiole—The stem of a leaf.

Pilose—With soft hairs; downy.

Pinnate—Feather-like, with the divisions extending fully to the rachis.

Pistil—The female organ of a flower, when complete consisting of of an ovary, style, and stigma.

Procumbent—Prostrate, trailing; lying flat on the ground.

Proximal—Nearest the body or centre or base of attachment; opposite of distal.

Puberulent—Covered with down or fine hair; minutely pubescent.

Pubescence—Hairiness.

Pubescent—Covered with short, soft hairs or down.

Punctate—Marked with dots, depressions, or translucent glands.

Raceme—An indeterminate inflorescence consisting of a central rachis bearing a number of flowers of nearly equal length.

Rachis—An axis bearing flowers or leaflets.

Radicle—Of, springing direct from, the root, or the main stem close to it.

Receptacle—Expanded portion of the axis that bears the floral organs.

Reflexed—Abruptly bent or turned downward.

Reniform—Kidney-shaped.

Reticulate—Forming a network.

Retrorse—Directed backward or downward.

Retuse—With a shallow notch at a rounded apex.

Rhizome—Underground stem.

Rhombic—Diamond-shaped.

Saccate—Bag-shaped; pouch like.

Sagittate—Enlarged at the base with two acute straight lobes, like the barbed head of an arrow.

Scandent—Climbing in any manner.

Scape—Leafless peduncle arising from the ground, it may bear scales or bracts and may be one or several-flowered.

Scarious—Thin, dry and membranous, not green.

Secund—Said of parts or organs, such as flowers, directed to one side only.

Septum—Any kind of partition.

Sericeous—Silky, clothed with closely appressed, soft, straight pubescence.

Serrate—Having sharp teeth pointing forward; like the edge of a saw.

Serrulate—Finely serrate.

Sessile—Not stalked.

Setaceous—Bristle-like; set with bristles.

Sinuate—With the outline of the margin deeply and strongly wavy.

Sinus—Cleft between adjacent lobes of a leaf or other expanded organ.

Spike—An inflorescence consisting of a central rachis bearing a number of sessile flowers.

Stamen—The male, pollen bearing, organ of the flower, consisting of anthers (pollen sacs) and filament.

Standard—The upper and broad more or less erect petal of a leguminous flower.

Stigma—The part of the pistil which receives the pollen.

Stipe—Stalk or stem, especially the support of a carpel.

Stipitate—Stalked.

Stipule—One of a pair of appendages borne at the base of the leaf in many plants.

Stolon—A sucker, runner, or any basal branch that is disposed to root.

Stoloniferous—With stolons or runners that take root.

Striate—With fine grooves, ridges, or lines of colour.

Strigillose—Minutely strigose.

Strigose—Beset with sharp-pointed, appressed straight and stiff hairs or bristles; hispid.

Strophiole—An appendage at the hilum of certain seeds.

Style—The more or less elongated part of the pistil between the ovary and the stigma.

Sub—Prefix denoting nearly, almost, or somewhat as "subopposite," more or less opposite.

Subulate—Awl-shaped; tapering to a fine point.

Sulcus—Small groove.

Sulcate—Grooved or furrowed longitudinally.

Suture—A junction or a seam of union; a line of opening or dehiscence.

Terete—Circular in cross-section.

Tomentose—Densely pubescent with matted wooly or short hairs.

Trifid—Divided into three parts.

Triquetrous—With three angles and three concave faces.

Truncate—Ending abruptly at apex or base, not rounded.

Tumid—Swollen.

Turgid—Swollen, distended.

Umbel—An indeterminate inflorescence consisting of several pedicellate flowers having a common point of attachment to the peduncle.

Umbo—A boss or protuberance.

Uniloculate—Having a single chamber or cavity.

Ventricose—Swelling or inflated on one side.

Verruca—Wartlike projection.

Verrucose—Covered with wartlike elevations.

Verticillate—Whorled with two or more leaves at a node.

Vestiture—A body covering, as of hairs, scales, etc.

Villous—With long, silky, but not matted hairs.

Viscid—Sticky.

Whorl—Cyclic arrangement of appendages at a node.

Wing—The lateral petal of a leguminous flower; any membranous expansion attached to an organ.

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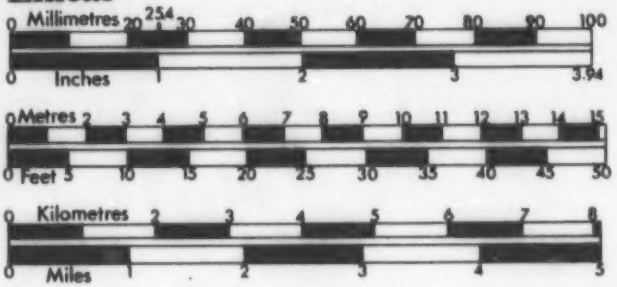
Metric Comparison Scales

Linear



Area

328·08 ft.

100 m.

Hectare (2.4 acres)

208·71 ft.

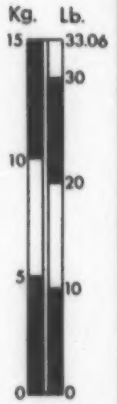
63·62 m.

Acre

107,639·1 sq. ft.
10,000 sq. m.

43,560 sq. ft.
4,046·86 sq. m.

Weight



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